THE IRON AGE

Special Articles

"Some Engineering Aspects of Nodular Iron Castings," starting on p. 79, discusses production applications of nodular iron and gives extensive data on microstructures and other physical properties. A modern materials handling installation putting ram, fork and hand-lift trucks, as well as scales, and hoists to their most efficient use is described in the article: "Champion Rivet Eliminates 90 pct of Manual Lifting Jobs," starting on p. 98.

Issue Highlights

Though it is no surprise to readers of THE IRON AGE, official announcement that five American steel companies —Republic, Armco, National, Wheeling and Youngstown Sheet & Tube—have taken options to join in developing Quebec-Labrador iron ore means that one of the century's key ore developments is at hand.—p. 109.

The steel industry snapped back to prestrike operating levels much faster this year than it did after the 1946 strike. Better weather and better coal, a good memory, more cold metal and some ingenuity are responsible.—p. 111.

Canadian production of increasingly strategic cobalt will increase sharply when a new smelter and refinery get into full production in Ontario. Development of gas turbines and jet engines highlights importance of cobalt in alloys and is stepping up U. S. demand.—p. 114.

A plan whereby used American machinery could be profitably employed abroad has been suggested by a machinery official. It urges that the government offer American firms two simple inducements that would immediately make available a vast resevoir of American tools for Point 4 nations.—p. 186.

Coming Next Week

An eye-opening economic study of tonnage steel melting in electric furnaces is presented in an article appearing next week. Improvements in electric arc furnace design and operation, together with various adverse raw material market conditions affecting openhearth practice, make the electric furnace a strong competitor to the openhearth in the production of carbon and tonnage alloy grades of steel.

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Can you guess which V belt will last 20 to 50% longer?

THE cross-section on the right is from an ordinary type of V belt; that on the left is from a B.F.Goodrich *grommet* V belt. Both belts are the same size — "E" sections. Both cost the same. Yet the BFG grommet belt may outlast the other from 20 to 50%! Here's why —

No cord ends — A grommet is endless, made by winding heavy cord on itself to form an endless loop. It has no overlapping ends (as in an ordinary V-belt cord section), no stiff, weakened section of "spliced" cord. Because most of the failures in ordinary V belts occur in the region where cords overlap, the endless cord section in a grommet V belt eliminates such failures.

Concentrated cord strength — All of the cord material in a B.F.Goodrich grommet V belt is *concentrated* in twin grommets, positioned close to the driving faces of the pulley. This eliminates "dishing" of cords in the center of the belt, insures full use of all cord strength, maximum power delivery, even load distribution. No layers of cords to rub against one another and generate heat; cord and adhesion failures are reduced.

Better grip, less slip — Because a grommet is endless, free of stiff overlap, a grommet V belt is more flexible, grips the pulleys better. Size for size, grommet V belts will give ⅓ more gripping power, pull heavier loads with a higher safety factor.

Only B.F.Goodrich has the grommet! — Twin grommet construction is an exclusive, patented B.F.Goodrich feature — no other V belt is a grommet V belt. (U. S. Patent No. 2,233,294) To get genuine grommet V belts (at present made in D and E sections only) see your local B.F.Goodrich distributor. Ask him to show you his "X-ray" belt that illustrates grommet construction clearly. *The B.F.Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

Grommet V Belts BY

B.F.Goodrich

Editorial

INDUSTRY VIEWPOINTS

Beware of the New Virus

THERE is a new virus going the rounds. No one has seen it but every one seems to be feeling the effects of it. There is no real cure at this time. Doctors are working on it.

The sad thing about this new virus is that it creeps up on you. First it eases the pain of getting something for nothing. Then it twists the brain center so that a hope becomes a fact. It blots out all lessons learned at home, at church and in school. It develops so fast that it often acts on the sympathetic nervous system and upsets the glands.

Emotions are stirred up to an extent that the patient feels that everyone owes him a living. That he ought to have everything he wants. In severe cases he believes the boss, the government, his wife, his children or even the priest or pastor are out to keep him from enjoying life without responsibility.

This virus appears to eliminate the positive and accentuate the negative. Nothing is right. Everything is going to the dogs. There is no hope except to work for the day when there will be nothing to do except get the monthly check from the government or the company.

There are some doctors who say this virus is the result of severe scar tissue carried over from the depression of the 1930's. Other experts think we are incapable of meeting the daily grind any more. Some mavericks believe the last war put the skids on our ability to face facts, work for what we want and save for a rainy day.

Research is still going on but the virus has not been isolated. It has an odd way of hitting all people. At first it seemed to hit the weary workers who saw nothing ahead but war, starvation and no chance to get the boss's job.

Lately there is a more ominous turn to events. This virus is attacking some of the people responsible for the industrial progress of the country. There is no telling how far it will go in that direction. If it becomes epidemic we may as well turn out the lights and just sit down and wait for doomsday.

Top management in some cases is rising up in arms. They are pointing to their own ranks where some officials are looking longingly at the pension age limit. At the pay to come. At the day when there will be no more decisions and lots of time to do nothing.

Before this mirage affects the best brains of the country it is probable that a cure will be discovered. Until then it is well to look out for the new virus which is nameless but which may be called "fear of living."

Tom C. Campbell

Editor

REPUBLIC Alloy Steel

Photo courtesy of The Euclid Road Machinery Co.

3-DIMENSION *Metallurgical Service...*

In this highly intricate field of Alloy Steels, REPUBLIC'S many years of pioneering research, together with its 3-Dimension Metallurgical Service—a coordination of *Field, Mill* and *Laboratory* Metallurgy—have made possible many notable advances in industry after industry. These advances have paid off repeatedly for manufacturers of countless products, improved through the proper application of Alloy Steels. THEY CAN DO THE SAME FOR YOU!

Other Republic Products include Carbon and Stainless Steels — Sheets, Strip, Plates, Pipe, Bars, Wire,

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Steel Stages Snappy Comeback

Planning Pays as Rate Hits 87.5

Scrap Prices Show Weakness

The Iron Age SUMMARY

IRON AND STEEL INDUSTRY TRENDS

STEEL buyers are getting shipments faster now than they did after the 1946 steel strike but "normal" delivery dates for many products can not be expected until March 1950 at the earliest. For items like cold-rolled sheets it may be May or June before balance returns to the industry.

A check made by THE IRON AGE reveals that Chicago mills are 4 to 6 days ahead of their 1946 post-strike performance despite the fact that the tieup lasted 6 weeks this year against 4 weeks in 1946. Operators credited this year's snappy comeback to four things: (1) Better weather, (2) adequate cold iron supplies, (3) better quality coal, and (4) lessons learned after the '46 tieup.

New Equipment Speeds Return

A more cooperative attitude by the steelworkers' union helped in some plants but the payoff came from planning. It came from the millions of dollars invested by steel companies in equipment to make better coal, and from newer and more efficient equipment throughout the industry.

Never before recognized is the experience steel mill operating men gained from the partial shutdowns that preceded strike threats earlier this year and the careful plans they had ready when the workers walked out on Oct. 1. In many steel plants the shutdown was carried out with a military exactness that included the charging of all soaking pits with ingot's ready to be heated and rolled soon after operations resumed. And with better quality coke, blast furnaces came through with good iron in record time.

Steelmaking operations for this week are scheduled at 87.5 pct of rated capacity, a 7.5 point gain over last week's revised rate. Thus, after losing about 10 million tons of raw steel, or 7,500,000 tons of finished steel products, the industry has passed its prestrike level. Next week the rate should top 90.

More Price Increases Ahead

Although the largest steel companies have not changed prices—and are not expected to for some months—several others have raised some quotations and more increases are likely. Last week one midwestern mill boosted semifinished steel and narrow hot-rolled strip by $5 a ton. When higher prices are posted by the top producers the increase is likely to consist—at least in part—of major changes in "extra" charges. A complete revision in such charges on the way at U. S. Steel earlier this year was quashed at the last minute. Many steel officials feel such a revision is overdue.

If its parts suppliers can get enough steel the auto industry expects to smash all first quarter production records next year. General Motors has already announced such a goal and is lining up conversion steel to back up its schedules. Just as it laid in an additional 3-weeks' steel supply long before the steel strike, GM apparently does not intend to let shortages cut into its schedules. At least two of the independents have followed the GM lead on conversion steel.

Scrap Composite Price Declines

Steelmaking scrap prices softened in many districts this week. Dealers and brokers have a lot of scrap on hand and mills are not rushing to buy it. At Chicago, No. 1 heavy melting steel was off $1 a gross ton; at Pittsburgh it dropped $2. With no change at Philadelphia, these declines sent THE IRON AGE steel scrap composite off $1.00 per ton to $28.92 per gross ton. Weakness also appeared at Cleveland, Youngstown, Detroit, New York and Boston and other areas.

The year's biggest raw material news broke this week with announcement that five American steel companies have joined a group working on development of Quebec-Labrador iron ore. The project means investment of perhaps $200 million in railroad and other facilities. The new group plans to ship some 10 million tons of ore a year from high-grade ore reserves where more than 355 million gross tons have already been proven. Eventually, more than a billion tons of ore may be uncovered in the district.

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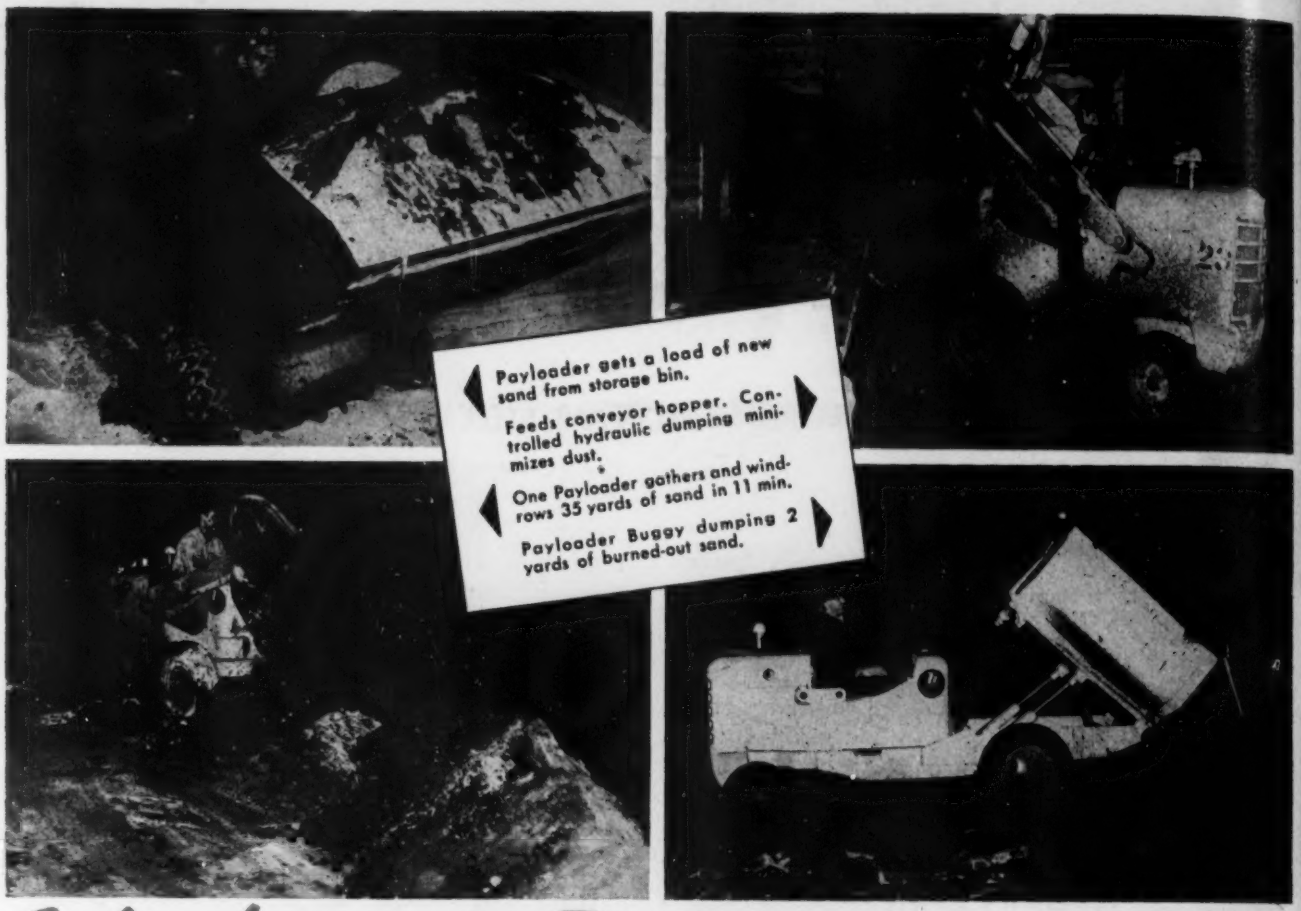

Payloader gets a load of new sand from storage bin.
Feeds conveyor hopper. Controlled hydraulic dumping minimizes dust.
One Payloader gathers and windrows 35 yards of sand in 11 min.
Payloader Buggy dumping 2 yards of burned-out sand.

Solved- A Tough *Bulk* Handling Problem

Six PAYLOADERS and one BUGGY Provide Fast, Flexible Handling System for Chicago Hardware Foundry Co.

PROBLEM: To store and distribute all types of bulk materials — to feed them into the production system without delays — to remove waste materials immediately from the production area — to recondition salvable materials — to lower production costs — to reduce foundry dust — to increase output per manhour — to increase safety.

1. Sand, new and reconditioned, must be brought to molders on schedule.
2. Slag must be removed promptly from furnace area.
3. Scrap cores must be quickly removed from the used sand.
4. Sprues must be promptly returned to cupolas.
5. Production interruptions due to unavoidable emergencies must be prevented.

SOLUTION: Six Model HA Payloaders and a Payloader Buggy, working an 18-19 hour day, handle sand, coke, slag, cores, sprues and bond. Each does the work of a crew of men. Together they have effected substantial savings, increased efficiency and increased production.

Tremendous production economies have resulted because Payloaders (1) supply a steady flow of new sand to production, (2) speedily shift many tons of used sand to the "shakeout," reducing manual shovel work to a minimum, (3) spread and windrow sand for reconditioning, (4) transport it to molding department and dump into hopper.

The Payloader Buggy hauls (1) sprues, an average of 325 ft. back to the cupolas, (2) broken cores to a pit 550 ft. distant, (3) burned-out sand to another pit equally distant.

Payloaders provide a complete, fast, flexible bulk material handling system for large or small foundries. There are sizes to meet your exact needs and conditions. Write for complete details today. The Frank G. Hough Co., 733 Sunnyside Avenue, Libertyville, Illinois.

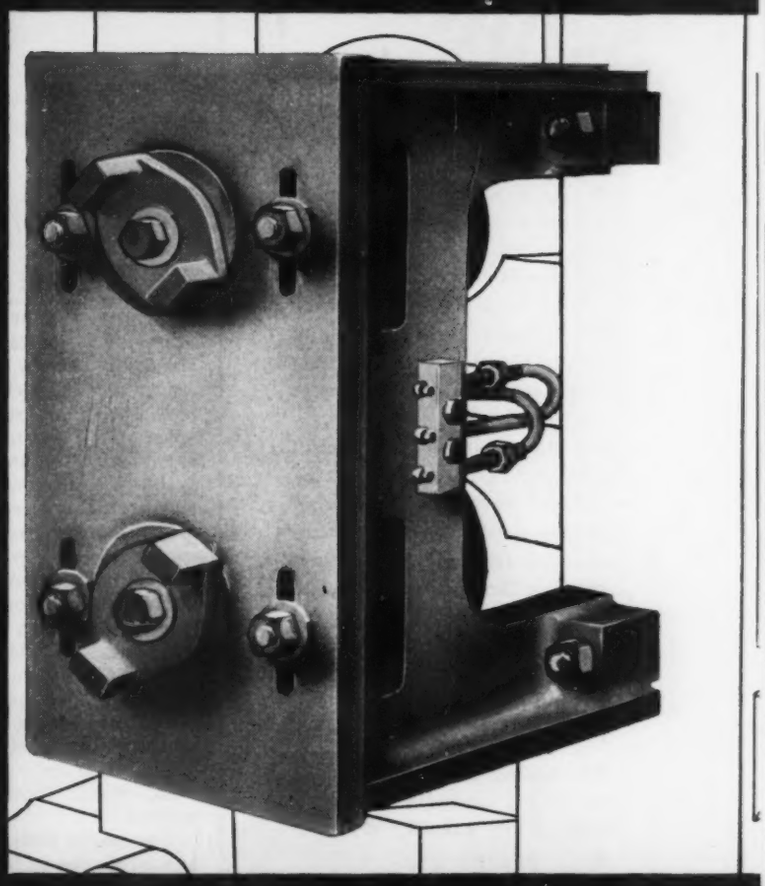
SEND for Job Study No. 10 . . .
A complete analysis of this foundry's modern materials handling system.

SAY "HUFF"

HOUGH
PAYLOADER
Manufactured by THE FRANK G. HOUGH CO.

Mack-Hemp

Improves Operating Efficiency of Rod, Bar and Shape Mills



Are you willing to gamble a 3¢ stamp

on lower unit costs for your product?

• JUST an ordinary 3c stamp may open the way to substantial savings for you—if you use it to send us an outline of your spring requirements. As they often have in the past, our skilled springmakers and practical, experienced engineers may be able to show you how you can reduce your spring costs and perhaps even make it possible to simplify assembly of your product. Accurate's unexcelled facilities and springmaking "know-how" are your best bet for the right spring for your job at the lowest overall cost. And we're prepared to show you the "proof of the pudding."

The sooner you "risk" that 3c stamp the sooner you'll be in line for the "pay-off." Why not do it TODAY?

Accurate Springs

A dependable source of supply!

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Springs, Wire Forms, Stampings

Fatigue Cracks

By Charles T. Post

Day's Work

If any of your young hopefuls are thinking of taking up journalism as a career, you can take it from your favorite family journal's brains department that there's more to the business than putting one word after another.

Keeping the readers happy takes more than a nose for news and a souped-up typewriter. Take the case of the mysterious hot saw, for instance. Not long ago one loyal reader became inquisitive about the mechanism which operated a steel mill hot saw which he had seen illustrated in another magazine. Although this other publication publishes long and learned articles on the steel industry, not one tittle of information could it supply when asked how the hot saw worked.

The reader then took pen in hand and wrote the editors of your f.f.j., enclosing a smudgy photostat of the picture of the saw, still wanting to know how it worked, but failing to mention the date or article with which it had appeared. The problem was handed to Tom Lloyd, whose title of machinery editor embraces the hot saw department. Detective Lloyd's first job was to thumb through back issues of the other publication until he found the article with which the photograph was published, no small task in itself. When he finally found it, he took out his trusty magnifying glass, took a good look, and the rest was easy.

Both the manufacturer of the saw and officials of the plant in which it was located were happy to fill-in Tom's description of the mechanism with complete working details which would have done credit to an instruction manual. All this was promptly passed along to the grateful reader, and Editor Lloyd went back to editing manuscripts.

The brains department is at your service any time your curiosity on any metals industry problem gets the better of you. But don't write every day, please, if you want to count on your f.f.j. hitting your desk promptly every week.

Pundit

We're busting our buttons today over the recognition granted our theory that the country's economic fever may be charted easily merely by watching the expressions on the faces of the newly elevated executives who grace the pages of "Iron Age Introduces . . .", the department several pages east of us.

Not that we've found agreement that a majority of smiles means good business ahead and vice versa for frowns. Among economic savants, disagreement from a learned colleague means quite as much as agreement. If enough differing opinions can be stirred up on your theory, you can easily wind up as a professor in some big university with 3 months' vacation a year.

Elton Sterrett, as one of the edi-

Turn to Page 173

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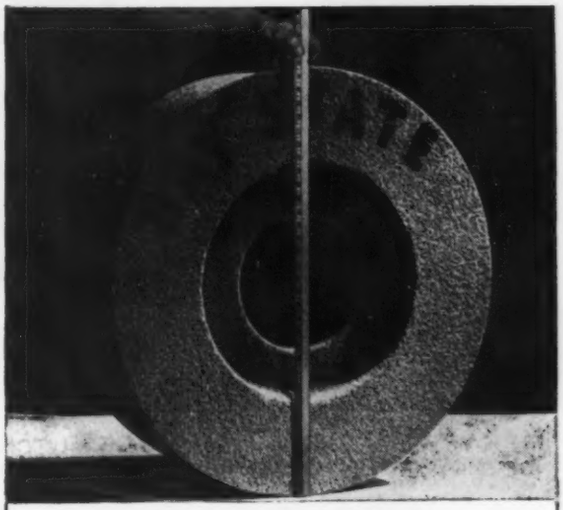
Grinding Wheels "Make Music"

Eighth in a series of Unusual Grinding Wheel Operations

● SMALL NEEDLES — LARGE GRINDING WHEELS

Phonograph needles are but one of the many types manufactured by the W. H. Bagshaw Co., Lowell, Mass. The large specially designed BAY STATE wheel, as illustrated, is being used successfully by them for the tapering operation.

Pointing steel phonograph, surgical or knitting needles may not be your grinding problem, but *whatever* it may be, Bay State can help you solve it . . . fast. You may find the exact specification to meet your requirements either from our large stocks in Westboro, branch warehouses or from our distributors. Write us if you do not know the location of our representative nearest you.



Typical Needle Grinding Wheel
32" x 10" x 10" (Concave Face)

BAY STATE ABRASIVE PRODUCTS CO.
Westboro, Massachusetts, U. S. A.

Branch Offices and Warehouses —
Chicago, Cleveland, Detroit, Pittsburgh.
Distributors — All Principal Cities.

MEMBER OF THE GRINDING WHEEL INSTITUTE

Top Performance Consistently Duplicated

Iron Age Introduces

EUGENE P. BERG, assistant general manager, Pershing Rd. plant, Link-Belt Co.

A. J. LAPOINTE, manager, process engineering laboratory, Lincoln-Mercury Div., Ford Motor Co.

L. F. VONIER, general sales manager, Welding Electrode & Equipment Div., A. O. Smith Corp.

Eugene P. Berg, formerly general superintendent, has been appointed to the newly created position of assistant general manager of the Pershing Rd. plant, Chicago, of LINK-BELT CO., Milwaukee. He had been general superintendent of the plant, a position he held since 1947. **Richard Moyer**, formerly superintendent of the steel shop, was named general superintendent, manufacturing department.

Carl W. Priesing has joined the DAYTON RUBBER CO., Dayton, as vice-president and general sales manager. Formerly he was general sales manager, Ansco Div., General Analine & Film Corp. **Herbert S. Waters** was appointed vice-president and director of products. He will have charge of merchandising and the preparation of products, other than tires, for the market after they have passed the laboratory and developmental stages.

A. J. Lapointe, a veteran of 25 years in chemical engineering research, has been appointed manager of the process engineering laboratory, Lincoln-Mercury Div., FORD MOTOR CO., Detroit. He will have charge of testing paints, enamels, oils and greases used by the division.

Herbert P. Grenda has been named regional manager of public relations for the Detroit region of GENERAL MOTORS CORP., Detroit. Mr. Grenda had been with the public relations staff in New York for the past 2 years. He rejoined GM in Chicago, with General Motors Acceptance Corp., after ending naval service in 1946.

T. L. Harrison, partner of Hardy, Stancliffe & Hardy, has been elected a director of SHIPPERS' CAR LINE CORP., a subsidiary of American Car & Foundry Co.

L. F. Vonier has been promoted to general sales manager, Welding Electrode & Equipment Div., A. O. SMITH CORP., Milwaukee. The move results from transfer of sales activities for this equipment from Chicago to Milwaukee, where they will be directed by **J. T. Pritchard**, division manager.

Frank R. Plum has been named director of sales of the Bakery Div., AMERICAN MACHINE & FOUNDRY CO., New York. He has been on the company's bakery machinery sales staff for the past 20 years.

Hilding Carlson has been appointed advertising and sales promotion manager of SELAS CORP OF AMERICA, Philadelphia. He was formerly managing editor of Dodge Reports Press Service and has also been regional executive of the U. S. Bureau of Labor Statistics in Cleveland and New York.

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STEPHEN C. MAY, vice-president and general sales manager, Blackmer Pump Co.

A. M. SHAW, assistant manager, pump and compressor merchandising division, Worthington Pump & Machinery Corp.

OTTO DOERNER, vice-president in charge of manufacturing and engineering, Cummins Business Machines Corp.

Otto Doerner has been elected vice-president in charge of manufacturing and engineering, CUMMINS BUSINESS MACHINES CORP., Chicago. Before joining the company more than 2 years ago Mr. Doerner was associated with National Cash Register, Zenith Radio and International Register.

P. R. Lyons has been appointed manager of electrical sales of the HANSON-VAN WINKLE-MUNNING CO., Matewan, N. J. Mr. Lyons was previously district manager of the company. **Martvig J. Moll** has been named manager of conveyor sales. Mr. Moll joined H-VW-M in 1923 to work on the Munning full automatic conveyor. **Irving A. Gemmell** has been designated as assistant manager of conveyor sales. Mr. Gemmell has served the company in various capacities.

Stephen C. May has been named vice-president and general sales manager, BLACKMER PUMP CO., Grand Rapids. In the past he has held sales executive positions with Auto-Soler Co., Iron Fireman Mfg. Co. and Darling Valve & Mfg. Co.

Neil Currie, Jr., formerly manager of manufacturing, has been appointed administrative assistant to the general manager of the Apparatus Dept., GENERAL ELECTRIC CO., Schenectady. **Ernest E. Johnson** has been named manager of engineering, Large Aparatus Divs. **Carl A. Salmonsen** becomes manager of manufacturing, Large Apparatus Divs.; **Byron A. Case,** manager of engineering, Small Apparatus Divs.; **Frank T. Lewis,** manager of manufacturing, Small Apparatus Divs.; **Clarence H. Linder,** assistant to the general manager; and **C. W. LaPierre,** manager, Aircraft Gas Turbine Divs.

John Kosmos has been named technical service man for the CHEMICAL CORP., Springfield, Mass. Mr. Kosmos has been actively engaged in material control, process control, metallurgy and metallography with Pratt & Whitney and Underwood.

Robert D. Hill has been elected treasurer of the TAYLOR WHARTON IRON & STEEL CO., High Bridge, N. J. He succeeds **Louis N. Allerton,** who retired. Mr. Hill was formerly with Noma Electric Corp and Union Switch & Signal Co.

A. M. Shaw has been appointed assistant manager, pump and compressor merchandising division, WORTHINGTON PUMP & MACHINERY CORP., Harrison, N. J. He will be responsible for developing pump and compressor sales to original equipment manufacturers.

Walter A. Kesterke has been appointed sales representative for industrial grinding wheels in Wisconsin and southwest Michigan by the U. S. RUBBER CO., New York. Mr. Kesterke was foundry superintendent of the Edgewater plant, Auto Specialties Mfg. Co., and foundry engineer with the Benton Harbor Malleable Industries, Benton Harbor, Mich.

Ernest Holme has been promoted to superintendent of the Indiana Harbor rolling mills of YOUNGSTOWN SHEET & TUBE CO., his second major promotion in a little more than 6 months. Early this year he was advanced from roller to assistant superintendent of the mills. In this promotion he succeeds **J. M. Mitchell,** who left the company. Mr. Holme joined the company at the age of 18 as a weighmaster. He held various line jobs in the mill and in 1931 became a roller in the bar and billet mills, the job he had when he was promoted early this year.

John B. Sutton, Jr., has been elected president and general manager of SUTTON ENGINEERING CO., Bellefonte, Pa. At the same time **O. J. Skawden** was appointed assistant general manager.

Iron Age Introduces

Continued

PAUL M. ARNALL, vice-president and general manager, The Lunkenheimer Co.

Paul M. Arnall will become vice-president and general manager, the LUKENHEIMER CO., Cincinnati, on Jan. 3. He formerly held executive positions with Graton & Knight Co., and with the Ohio Injector Co. In dividing the function of president and general manager among two executives, **Frank P. Rhame** will be president after Jan. 3.

F. P. Taugher has been named manager of engineering, Industrial Control Div., WESTINGHOUSE ELECTRIC CORP., Pittsburgh. For the past 5 years he has been engineering and service manager in the company's New England district. **M. L. Gardner** replaces him in New England. Mr. Gardner's previous position was that of engineering manager for the district engineering and service department at East Pittsburgh. **J. O. Clevenger** becomes manager of the company's welding department, located at Buffalo. He joined the company in 1927 and has been manager of agency and specialty sales for the Southeastern district since January 1947.

Allyn C. Beardsell, headquarters supervisor of merchandise packaging and warehouse methods, Western Electric Co., resigned on Dec. 1 to accept a position with **CONTAINER LABORATORIES, INC.**, New York. Mr. Beardsell has served on various packaging and package testing committees and has delivered a number of talks and lectures on the subject.

Bernard W. Weber has been appointed manager of the East Chicago, Ind., plant of METAL & THERMIT CORP., New York. He was formerly manager of the Seattle plant of the American Can Co. **W. S. Leinhardt**, formerly general superintendent of the East Chicago plant, is now technical assistant to the vice-president of production. **William C. Cuntz**, formerly manager of the sales office and warehouse in Pittsburgh, has been made district manager at Chicago. **Orville T. Barnett**, formerly manager of the Newark, N. J., office, has been appointed district manager at Pittsburgh. **Robert T. Brown** has been made district manager at Newark, N. J.

P. J. MURRAY, whose election to the directorate of Detrex Corp. was reported in THE IRON AGE last week.

William J. McQuillan has been promoted to Pittsburgh branch manager of MORSE CHAIN CO., Ithaca, N. Y., a division of Borg-Warner Corp. Prior to joining the sales staff of the company Mr. McQuillan was associated with the sales department of H. Y. Robertson Co., Pittsburgh.

Omar V. Greene has been appointed New England sales manager with headquarters in Hartford, Conn., for the CARPENTER STEEL CO., Reading, Pa., succeeding **Wynn F. Rossiter**, who has been made assistant to the vice-president to devote his time to special work. **John W. Thompson**, formerly manager of alloy steel sales, has been named manager of sales development to succeed Mr. Greene.

Ben O. Howard has been named general manager of the FAIRCHILD AIRCRAFT DIVISION, Hagerstown, Md. Mr. Howard is now a director and consultant to the Consolidated Vultee Aircraft Corp., San Diego.

F. B. Law has been appointed manager of manufacturing for Aeronautic and Ordnance Systems Divs. for GENERAL ELECTRIC CO., Schenectady, N. Y., succeeding **Frank T. Lewis**, who has been named manager of manufacturing, Small Apparatus Divs. Mr. Law has been assistant to the manager of manufacturing for the divisions.

Creston E. Kite has been named general manager of the UNISTRUT EASTERN SERVICE CO., Irvington, N. J. Mr. Kite was formerly vice-president in charge of sales of the General Alloys Co., Boston.

B. Thor Bjornstad has been named district engineer of the AUSTIN CO., Seattle. Mr. Bjornstad joined Austin as a structural engineer on its special staff at the Sand Point Naval Station in 1940.

Paul A. Girod has been appointed resident salesman in the Philadelphia office of the Berger Mfg. Div., REPUBLIC STEEL CORP., Cleveland. Mr. Girod was formerly a sales trainee for the company.

Harry C. Gross has been elected chief chemist and metallurgist of the TUNGSTEN ALLOY MFG. CO., INC., Newark, N. J. Prior to his association with the company Mr. Gross was with Westinghouse Lamp Co., Callite Tungsten Corp., and Sirian Wire and Contact Co.

John S. Roller has joined REPUBLIC SUPPLY CO., Houston, as general manager of sales. He had been assistant sales manager, Birmingham district, Republic Steel Corp. **Don L. Collins**, formerly executive vice-president and general manager of sales, will continue his duties as executive vice-president of the company.

JOHN S. ROLLER, general manager of sales, Republic Supply Co.

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.002" is not much . . . less than the thickness of this sheet of paper.

. . . Yet a .002" oversize variation, common in commercial quality strip steel (standard thickness tolerance, .020" thick: plus or minus .002"; standard crown tolerance, over 12" wide: plus .002") adds 1⅓ ounces to the weight of a square foot of .020" strip, increasing the weight from 13⅓ ounces to 14⅔ ounces.

This means you lose 219 square feet on every ton of .020" strip steel which runs a permissible .002" oversize.

. . . The wear on fabricating dies sized to handle .020" strip is obvious. Often the number of units produced per die grind is reduced 15% or more.

You can avoid much of this loss by using CMP THINSTEEL. With a plus or minus thickness tolerance often ½ or less of commercial tolerances, "yield" per ton can be increased as much as 10% or more while tool life increases of 10% to 15% are common.

In addition, you can reduce machine shutdown and change-over time by ordering CMP THINSTEEL in extra-long coils—up to 300 pounds per inch of width.

Why not let a CMP representative show you how much you can save by using THINSTEEL.

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in these grades and sizes

LOW CARBON—Four rolled tempers or dead soft annealed. Regular #2 finish or #3 bright for plating plus electro zinc coated for corrosion resistance. Cold rolled strip steel .001" and heavier, up to 24" wide.

SPRING STEEL—.25% to 1.35% maximum carbon. Four rolled tempers or spheroidized annealed plus hardened and tempered grades in thin sizes. All finishes, spring steel .001" and heavier.

STAINLESS STEEL—All popular types and finishes plus the CMP exclusive bright annealed chrome-nickel grades in thicknesses from .001" up. High tensile grades are a particular CMP stainless strip speciality.

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GLOBAL LETTER

REVIEW OF WORLD MARKETS

Delay in nationalizing British steel industry now seems certain . . . French steel industry sets records in production and export . . . Brazil industry expands.

London—The government, after vowing for months that they would never consent, have in the end made concessions to the upper chamber on the steel nationalization bill.

The House of Lords made a large number of amendments to the Bill. The House of Commons accepted 28 amendments which were largely drafting matters and rejected 32.

Among those which were rejected was the proposal that where the stock exchange valuation of a steel company's shares was held to be inequitable provision should be made for a variation of this valuation.

Delay Seems Certain

The Lords finally agreed to accept the rejection of the majority of their amendments but insisted on those which would alter the date on which the bill would come into force. The government has now accepted in principle the contention of the House of Lords that the iron and steel bill should not come into force until the electors have had an opportunity of expressing their opinion upon it.

Amendments moved by Mr. George Strauss, Minister of Supply, postponed the date for taking over from May 1 next to Jan. 1, 1951, and provide that the Ministry shall not appoint any member of the proposed Iron and Steel Corp. before Oct. 1, 1950.

Election Date Still Open

The government had maintained all along that it would not tolerate a change in date. Evidently it has now become apparent that there is a tactical advantage to be gained by having the bill on the statute book by Christmas. Withdrawal of the Lord's amendments will make this possible.

The government now will not be tied as to the election date. The present Parliament cannot go on longer than next August, and, with this controversial matter out of the way, Mr. Attlee is free to choose any date for the general election between January and August.

Provides Referendum

A compromise was agreed to without a vote by the House of Commons. Mr. Churchill, as leader of the opposition, said that there was no practical difference between the government's decision and the Lords' view. He emphasized that the election will give almost a direct referendum on steel nationalization and promised that if the Conservatives are returned, they will at once remove the act from the statute book.

French Steel Industry Sets Records in Production, Export

Paris—Production and exports of the French iron and steel industry hit new high levels in October. Crude steel output reached 809,000 tons in the French works. This is equal to the monthly average of 1929, the best of the prewar years.

Output of the Saar works during October was 148,000. This makes a grand total for the two of 957,000 tons, or an annual rate of about 11.4 million tons. Production during 1948 totaled 8.4 million tons.

Finished rolled products in October totaled 536,000 tons in France and 112,000 tons in the Saar. Together they equalled 648,000 tons.

STEEL PRODUCTION—FRANCE AND SAAR

	Monthly Average	Sept.	Oct.
FRANCE	1929	1949	1949
Pig Iron	858,000	657,000	699,000
Crude Steel ..	809,000	721,000	809,000
Rolled Finished Products ..	544,000	521,000	536,000
SAAR			
Pig Iron	175,000	122,000	137,000
Crude Steel ..	184,000	140,000	148,000
Rolled Finished Products ..	126,000	103,000	112,000
Total FRANCE AND SAAR			
Pig Iron	1,033,000	779,000	836,000
Crude Steel ..	993,000	861,000	957,000
Rolled Finished Products ..	670,000	624,000	648,000

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Morse *means* Power Transmission

Morse Roller Chain Drives

Morse Silent Chain Drives

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Morse Silent Chain Couplings

Morse Morflex Couplings

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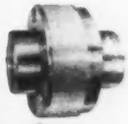

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Morse-Rockford Pullmore Clutches

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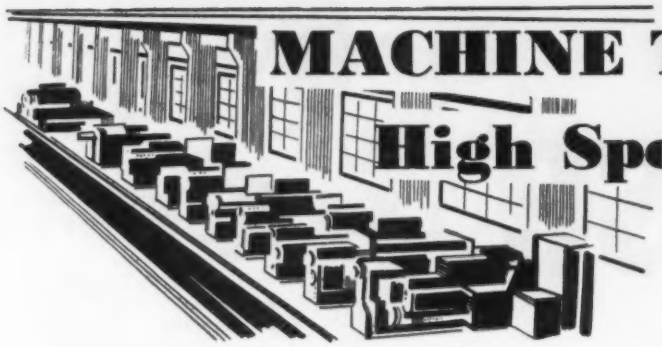

MACHINE TOOL High Spots

Sales Inquiries and Production

Possible tariff cuts cloud the machine tool picture . . . French orders confused following the devaluation of the franc.

by William A. Lloyd

Cleveland—Several developments, including a possible reduction in tariffs on machine tools, were clouding the outlook for the machine tool industry this week, an outlook according to some observers, more optimistic than new orders warrant.

While the difficulties in generalizing about an industry that goes in as many directions simultaneously as the machine tool industry does are obvious, at the moment 1950 looks like a fair year. Business is, as usual, spotty. Some segments of the industry are getting foreign business but the number of companies is dropping, as is the volume of foreign business.

In the domestic market, replacement buying is the major factor in most sales sectors, although future plans of the automobile industry hold great promise. Heavy machines are moving well, in general, and special purpose equipment is staging a substantial comeback, according to trade reports. Also entering the picture is special assembly equipment.

French Orders Confused

A problem at the moment is the fate of a number of machines ordered under ECA by some French companies. The machines were built, paid for in dollars, and shipped to France. Then came devaluation. The French companies did not have enough francs to pay for the machines, leaving the French distributors in the middle. Now the French distributors want the companies to get ECA to do something about it and the builders of the machines, according to reports, have countered with the suggestion that the distributors go to the French government. In the meantime, the machines are in a warehouse.

As for tariffs, trade sources reported this week that a meeting on tariffs has been tentatively scheduled for early next year. According to experts, an effort will be made to cut the tariffs on foreign machine tools.

Index Is Fairly Steady

Effect of the steel strike on the industry's October business was evident this week in the index of new orders and shipments of machine tools, released by National Machine Tool Builders Assn., Cleveland. Preliminary index of October orders was reported at 56.8, compared with 57.7 for September and 51.5 for August. Index of foreign orders, which are included in the total, was reported at 13.8 compared with 13.7 for September and 18.8 for August.

Preliminary index of October shipments was reported 62.3 compared with 67.6 in September and 67.3 for August. Preliminary ratio of unfilled orders to shipments was 3.8 to 1 compared to 3.7 to 1 in September and 3.8 to 1 in August.

Although October orders were less than an estimated $1 million under the September level, the steel strike halted temporarily at least the steady advances in order volume the industry has been chalking up since the July low point, when the NMTBA index dropped to 48.

Detroit Activity Holds

In Detroit, confirmed and rumored activity on new automatic transmissions and high compression engines has lifted and held the tempo of machine tool activity at levels substantially above the midsummer level.

Probably the most active program at the moment is tooling for the new Ford automatic transmission. Trade sources believe the new Ford Cincinnati transmission plant will closely parallel the Borg-Warner installation at Muncie, Ind. The plant will use 100 pct new equipment, it is reported.

Receives Additional Requests

Additional requests for quotations on a new Chrysler engine have been received in addition to a small amount of product improvement for Chrysler divisions.

Some activity at Continental Motors, Muskegon, Mich., has been interpreted as a possible new power plant for the Kaiser-Frazer light car.

The impression is growing in Detroit that with the introduction of Chevrolet's new automatic transmission early next year the industry's drive for automatic shifting units will be stepped up substantially.

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2. *Manual loading and automatic disposal*
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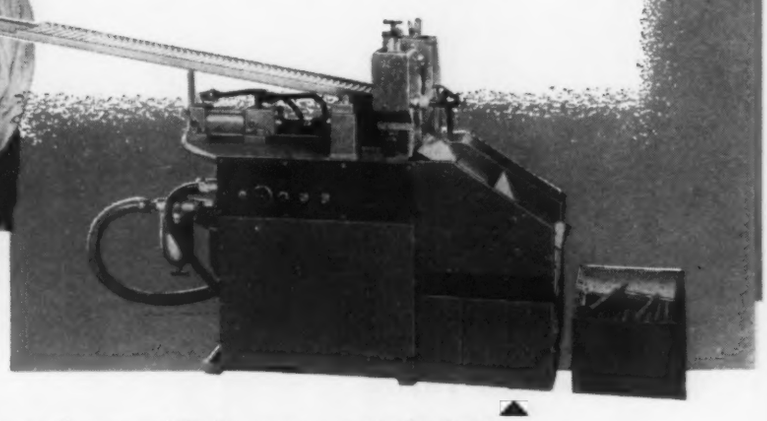
This single-motor, compact machine automatically gages and sorts antifriction bearing rolls. It rejects rolls above or below manufacturing tolerance and separates accepted rolls into 5 sized categories, in increments of .00002".



This machine gages and sorts straight sleeves—measuring for length as well as diameter at both ends. The sleeves are segregated into four categories. **1.** *Oversize and undersize in length regardless of diameter.* **2.** *Small in diameter at either or both ends.* **3.** *Large in diameter at either or both ends.* **4.** *Good sleeves within tolerance.*

The machine has a production rate of approximately 3000 per hour. The capacity is adjustable for different lengths and diameters. It is loaded manually with automatic disposal.

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Ball Bearings

Five types of self - sealed, lubricated for life, ball bearings designed for belt and trolley conveyers are described in new 16-p. booklet. *New Departure. For more information, check No. 2 on the postcard.*

Hydraulic Cylinders

Photos, details, and selection charts describe Hydro-Line air and hydraulic cylinders in 32-p. booklet. *Hydro-Line Mfg. Co. For more information, check No. 3 on the postcard.*

Casters and Wheels

Catalog No. 115 describes K & J line of industrial casters and wheels in 26 p. of photos, details, and charts. *Kilbourne & Jacobs Mfg. Co. For more information, check No. 4 on the postcard.*

Venturi-Ball Valves

New 16-p. bulletin describes Venturi-Ball valves, and shows operating and engineering data. *Paul Valve Corp. For more information, check No. 5 on the postcard.*

Tool Balancer

The Platz automatic - balancing production tool hoist for suspending tools above the production line when not in use is described in 4-p. catalog. *Platz Co. For more information, check No. 6 on the postcard.*

Stainless Stock Sheets

Stock sheets 111 and 112 list stainless steel sheet, strip, tube wire, and rod sizes and include prices and specifications. *Dependable Sales Corp. For more information, check No. 7 on the postcard.*

Optical Comparators

Accessory equipment such as radius charts, grid charts, protractor charts, screw thread charts, and standard inspection charts for optical comparators are described and illustrated in 18-p. catalog. *Jones & Lamson Machine Co. For more inmation, check No. 8 on the postcard.*

Wirebound Boxes

"What to Expect from Wirebound Boxes and Crates," a new 16-p. color booklet, lists and illustrates wrapping applications for the information and guidance of shippers and industrial packaging engineers. *Wirebound Box Manufacturers Assn. For more information, check No. 9 on the postcard.*

Dial Air Gage

New dial-type, Precisionaire air gages are described and illustrated in 14-p. catalog. Applications, specifications, capacities and ranges are shown. *Sheffield Corp. For more information, check No. 10 on the postcard.*

Cold Roll Machines

The complete Yoder line of cold roll forming machines, punch presses, and other metal working equipment is described through extensive use of photos and text in 74-p. two color booklet. *Yoder Co. For more information, check No. 11 on the postcard.*

Powder Metallurgy

A new bulletin on powder metallurgy explains powder metallurgy engineering and its wide range of applications through use of well illustrated case studies. *American Sintered Alloys, Inc. For more information, check No. 12 on the postcard.*

Spring Steels

A complete stock listing of strip and spring steels appear in new 98-p. catalog. Photos, details, and

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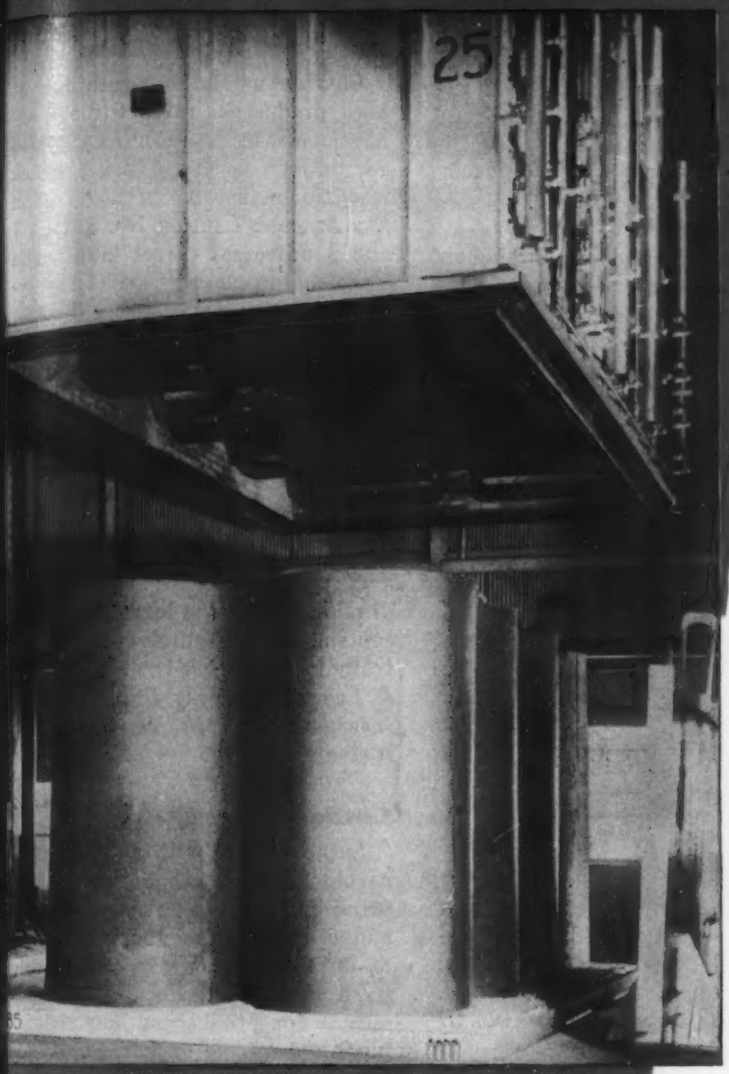

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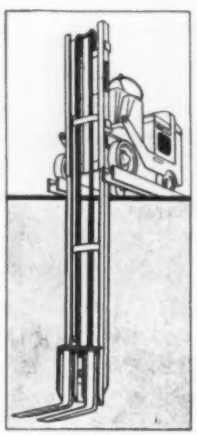
base of a 20-ton, 12-in. stroke, hydraulic assembly type press, are clamped with movable slides on each side and are broached in one

pass with one-piece dies having only one set of teeth. To sharpen the broach, the only operation required is grinding off the top face, the wheel being set at a slight angle and the die turned during the grinding so that the correct hook is produced on the cutting face. The broach die head is guided to assure alignment during the stroke. *Colonial Broach Co. For more information, check No.* 35 *on the postcard on p.* 35.

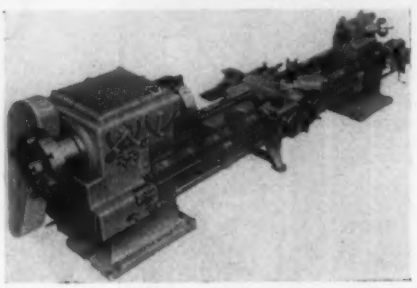
Elevator Truck

A new Elevator fork lift truck lowers and raises heavy loads between balcony storage areas and first floor production lines. A special non-tilt mast and carriage assembly permits the load carrying forks to be lowered 98 in. below balcony floor level and the elevator unit has a lifting and lowering capacity of 2000 lb. Full capacity loads can be lifted from first floor to 10 in. above balcony floor level. *Towmotor Corp. For more information, check No.* 36 *on the postcard on p.* 35.



Hollow Spindle Lathe

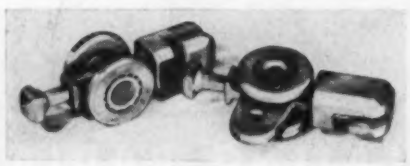
The new LeBlond 20-in. hollow spindle lathe has 9-in. bore; 18-speed geared headstock including speeds from 10 to 362 rpm; totally enclosed and automatically lubricated quick change box with 63 feed and thread changes; 20-hp main drive motor; electric brake with apron spindle control; and hardened and ground steel bed ways front and rear. It swings 27 in. over bed and carriage wings and may be furnished in center dis-



tances beginning at 48 in. and increasing in increments of 24 in. *R. K. LeBlond Machine Tool Co. For more information, check No.* 37 *on the postcard on p.* 35.

Overhead Conveyer

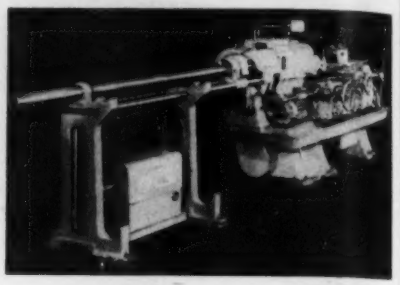
A universal joint type chain, featured in the Un-O-Veyor overhead conveyer, consists of links that connect to form a universal joint. A malleable iron link and



universal joint is formed into one integral unit and a clevis is arranged at multiples of 9 in. Each link has a set of two 2-in. diam hardened steel ball-bearing wheels, the load carrying wheel being vertical and the wheels of the next link horizontal to carry the thrust around corners. It is said to offer substantial savings because of its heavy load-carrying capacity. *Michna Systems. For more information, check No.* 38 *on the postcard on p.* 35.

Bar Feed Mechanism

Continuous lathe operation at high production rates without exhausting the operator is claimed for a bar feed and collet chuck mechanism that can be installed on any Jones & Lamson No. 3, 4, 5, 7 and 8 universal turret lathe. The complete operating cycle is hy-



draulic with single lever, finger tip control from a single panel, centrally located above the lathe. *Jones & Lamson Machine Co. For more information, check No.* 39 *on the postcard on p.* 35.

Lathe Centers

Lathe centers with 60° tungsten carbide tips are being manufactured for use on lathes, grinders, and other machine tools. Because of durability under severe operating conditions, the centers are desirable for production jobs requiring high spindle speeds, long continuous cuts, and heavy roughing operations. Centers are available with standard No. 2 and 3 Morse taper shanks. *South Bend Lathe Works. For more information, check No.* 40 *on the postcard on p.* 35.

Portable Honing Head

Sizing and finishing holes is simplified with a new portable honing tool, the Honall, that is used with

portable drill, lathe or drill press. It is recommended for generating round, straight holes with accuracy to 0.0001 in. and with surface finish as fine as 2 microinches rms in hardened steel. Honalls range from 3/16 to 1 in. in all metals except

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● One of the best known manufacturers of air circuit breakers in the country is the I-T-E Circuit Breaker Company, located at 19th and Hamilton Streets in Philadelphia. From its inception the company has displayed unusual receptiveness to new ideas, whether from within or without; hence it has done its share of pioneering, and perhaps more. Revere is proud to play a part in its progress, through close collaboration with I-T-E engineers, production men, and the purchasing department. The extensive use of Revere Extruded Shapes is but one result of our mutual attack upon I-T-E problems, which the company is good enough to say has saved a great deal of money, as well as made possible a better product... Perhaps similar results would be obtained if you gave us the opportunity to place our knowledge as well as our metals at your disposal. Why not inquire?

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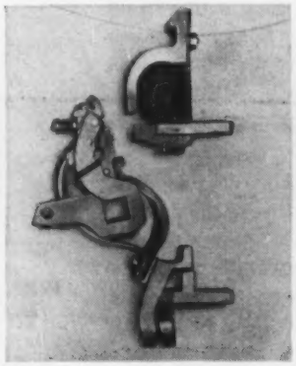
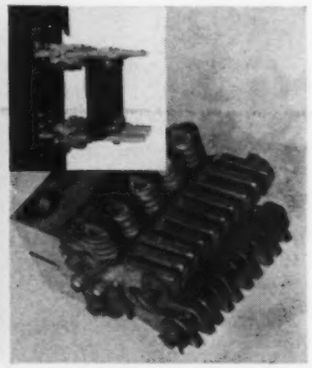
This is but a part of the I-T-E Stock of Revere Extruded Shapes in copper, brass, manganese bronze, and aluminum. I-T-E is a great advocate of extruded shapes, from long experience finding them markedly superior, in uniformity, strength, and economy due to the fact that a great deal of machining is avoided.



(*Left*) I-T-E Contact Block made from an extruded shape. This was formerly extruded in electrolytic copper; changing to Revere Free-Cutting Copper resulted in a saving of 30% in machining time. (*Right*) I-T-E "K" Breaker, Main Contact Assembly in open position. This is an especially interesting assembly, since it shows no less than eight extruded shapes in copper and bronze. Use of these shapes makes the assembly more compact, stronger, lighter, and considerably more economical to produce. The contacts are silver alloy, and the unit is silver plated.... In addition to supplying I-T-E with extruded shapes, and strip, Revere furnishes rolls, bar, rod, sheets, in a wide range of non-ferrous alloys, and seamless brass tube.



(*Left*) Main movable Contacts and Flexible Connectors in an I-T-E "K" Type Circuit Breaker. The two contacts are made from Revere Extruded Shapes. Revere and I-T-E collaborated closely on the specifications for the thin-gauge copper strip for the pigtails, working out the correct gauge and temper to avoid notch effects and cracking of the connection at the braze. (*Right*) Main Separable Contacts from an I-T-E Type "LG" Circuit Breaker. These are stamped from Revere Copper Strip with the temper specially controlled to eliminate a de-burring operation previously found necessary to obtain edge surface suitable for electrical contacts. (*Inset*) Back view of "K" type Breaker showing a similar type of contact.

On the ASSEMBLY LINE

AUTOMOTIVE NEWS AND OPINIONS

GM Technical Center has many interesting innovations in facilities and planning . . . Hudson shows way of attacking high tooling costs . . . Willys centralizes its operations.

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by Walter G. Patton

Detroit—In the summer of 1951 the Research Div. of General Motors will occupy its new quarters at 12 Mile and Mound Rd. near Detroit. In a recent issue of *Lab Notes*, published by GM's Research Div., detailed information about the new laboratory has been disclosed for the first time.

There will be four main units. The Metallurgical Bldg., now under construction, will house a foundry and metallurgical pilot plant. This unit is 320 ft long and 110 ft wide. The center area, measuring 50 ft wide and extending 230 ft from one end of the building, will be devoted to foundry and metallurgical pilot plant work. The foundry section will contain electric and gas furnaces and a large molding and pouring floor. Space has been left for a cupola if it is decided later to install one. Other equipment will include ovens, presses, quenching tanks, and generators. There will be an X-ray machine and physical test devices. In the south end of the building, opposite the foundry, there will be a complete pattern shop.

Will Build Special Labs

The second floor of the building will be devoted to engineering offices and various metallurgical laboratories. This floor will extend around the foundry-pilot plant area as a balcony. There will be special testing areas for high temperature work, corrosion and spray tests, humidity room and deep etching.

Construction is scheduled to start soon on the Mechanical Bldg. which will be principally an assembly and testing area for automotive engineering. This building will have an area 160 ft long and 75 ft wide with a 30-ft ceiling.

Building To Be U-Shaped

An airflow laboratory will be located in this unit. The lab will be equipped with a large displacement tank to be used for calibration of orifices and for airflow studies.

Two wings, 275 ft long and 70 ft wide, will extend off of the general work area to form a U-shaped building. Initially 36 test cells will be installed. In addition to engine testing, test cells will be available for transmission, rear axle and similar work. For rear axle work, there will be two special high torque, low speed absorption units. One test cell will be equipped suitably for development or test work on engines as large or larger than GM diesels.

GM's new Research Process Bldg. will house a large machine shop, heat treat department, electro-plating laboratory, garage and cold room facilities. This building will occupy almost 3 acres.

The machine shop will specialize, as in the past, in high precision work. Experimental models will be built here and new manufacturing techniques will be developed. It is also planned to train manufacturing personnel here.

Will Build Test Equipment

This division will build piston and connecting rod balancing machines. It will also supply GM-developed dynamic balancing equipment, fatigue and bearing test machines and hardenability test fixtures. GM expects to increase its electro-plating activity substantially at its new research quarters.

The three-story main building will be known as the Kettering

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Laboratories. This structure will be 670 ft long and 55 ft wide and will overlook a large pool around which the Technical Center will be constructed. This building will house the following departments: Organic, inorganic, electro and industrial hygiene; electrical research including ignition and electronics; instrumentation and physics.

Hudson Invades Lower-Priced Field by Cutting Tooling Costs

Hudson's invasion of the lower-priced field with its new Pacemaker may cause some of the cost experts in the auto industry to resharpen their pencils. With so much emphasis being placed on high tooling costs, it is significant that the design changes in the new Hudson are restricted to the front one-third of the car which is built and assembled separately. From the windshield back, the car is identical with other Hudson models.

New Tooling Required

Total tooling costs are not available but are undoubtedly among the lowest in the history of the industry.

In the new Hudson Pacemaker, overall length has been reduced approximately 5 in. The wheelbase has been cut back about the same amount. Some of the overhang in front has been eliminated and, by pushing the engine back as far as possible under the cowl, the substantial reduction in length of the car has been accomplished. This change was contemplated at the time Hudson brought out its new "step-down" design, it is now disclosed.

In making the change, Hudson has undoubtedly had to purchase a considerable amount of new tooling. In all probability, new front fender dies, hood top dies and a number of dies for the "wheelbarrow" frame had to be purchased. There are undoubtedly some substantial changes in jigs and fixtures.

Hudson has also made one important change in its six cylinder engine. The stroke has been reduced from 4⅜ in. to 3⅞ in. This result could be obtained, it is believed, either by shortening the piston assembly or changing the crankshaft design. It is not clear which course was elected by Hudson engineers.

The bore of the Hudson six cylinder engine remains at 3 9/16 in. Displacement has been cut from 261.55 to 232 cu in. The horsepower rating of the engine is 112 compared with 121 hp for the Hudson six with 4⅜ in. stroke.

Instrument Panel Redesigned

The Hudson instrument panel is a new design with a simulated fabric finish. Dials are closely grouped in front of the driver. The instrument needles and markings are phosphorescent plastic.

Announcement of its new Pacemaker indicates that Hudson is now ready to go forward on a substantial scale with its "Super-Matic Drive," a semiautomatic transmission which has been available for some time. Hudson engineers are careful to emphasize the advantage of a transmission that can be changed over to conventional drive by merely touching a button.

The factory list price of the three-passenger Pacemaker coupe is $1675 and for the four-door sedan, $1795. New prices are approximately $250 lower than the previous Hudson 6-cylinder models.

NOW THEY'LL STAY CLEAN: U. S. Rubber Co. researchers have developed a new scuff-proof whitewall tire that is said to resist scars and markings from curb-stone parking. The new tires also have a special tread designed to provide maximum traction, particularly under bad driving conditions. In many situations, it is claimed, the tires offer traction qualities equal to that of a motor vehicle equipped with chains. The narrow white band is protected by a guarding rib of rubber around the outer rim of the whitewall.

Discovers Auto Engineer's Hobby

Our Dept. of Incidental Intelligence has discovered that automobile engineers ride some strange hobbies. Take the well-known automotive expert who invents gadgets for cutting his own hair. He's been successful enough at it, we learn, so that he hasn't had to patronize a barber shop for more than 2 years.

"Some skill must be developed to use the device," we are told, "but it works very successfully after a little preliminary instruction and practice." Anybody who prides himself in having skill in his hands can learn to use it, we are assured.

Construction of the device is simple, consisting of several small forgings or castings and some pressed metal parts. At the present time the device is not being manufactured for sale to the public.

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WEST COAST PROGRESS REPORT

Proposed small independent steel plants in L.A. area appear to be out of the picture . . . Shipyard turns to railroad business.

Digest of Far West Industrial Activity

by J. Reinhardt

Los Angeles—Expansions of facilities by major steel producers in this area and perhaps a more realistic view of steel demand apparently have combined to discourage at least two more of the several independent steel plants which have been in the promotion stage during the last 2 years.

Lewis B. Kean reports his proposed small electric furnace and rod mill operation as being in abeyance; and R. W. Stuler, who has been working with a local group with the intention of putting in a small sheet mill, states that project is still in the blueprint stage.

There is even some conjecture and discussion in the trade as to the ultimate intention of Columbia Steel Co. in regard to the cold-rolled sheet mill which the company announced would be built in the facilities formerly occupied by Alcoa here. This plant has been completely gutted of alumina reduction equipment and Columbia has an engineering staff at work on layout design and it is known that equipment is on order. However the long delay in bringing in rolling equipment has caused some members of the trade to wonder if this project too might be "in abeyance."

Scrap Supplies Adequate

There are unconfirmed reports that one of the small electric furnace operators in this territory is looking for a buyer for the furnace and rolling mill.

The three major producers in this area are operating at full capacity with no curtailments in sight.

Scrap from the northern part of the state continues to move into local furnaces although buyers insist there is no acute shortage here at present.

All furnace operators contend that for the present at least there is no shortage of scrap and that inventories on hand are adequate for "some" months. However, it is believed that should operations continue at capacity levels the scrap market would tighten appreciably.

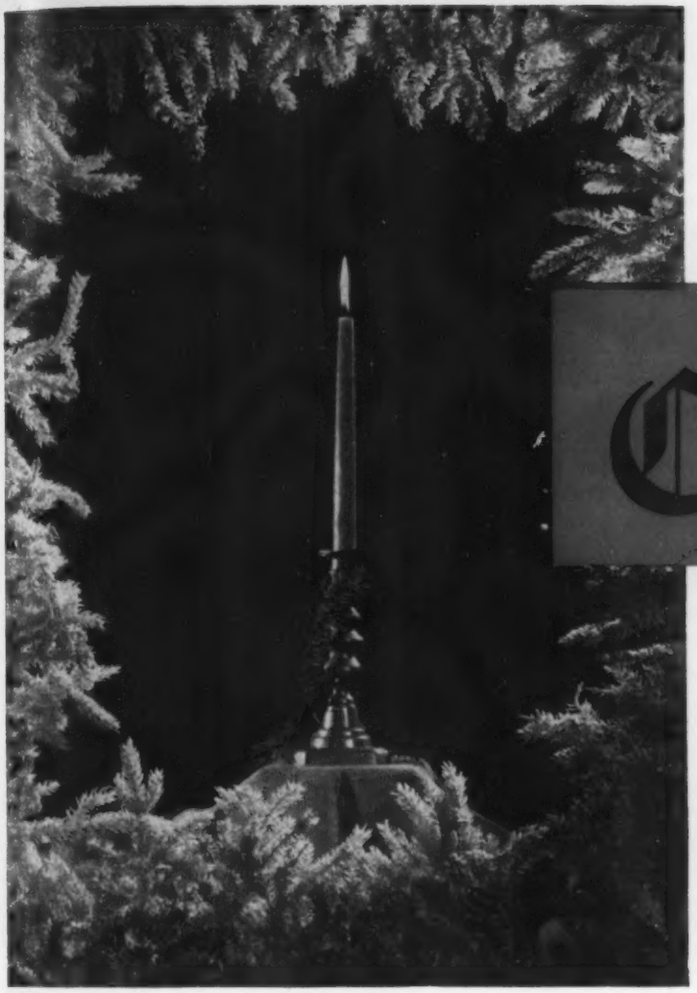
Openhearth Practice Discussed At AIM&ME Regional Conference

Los Angeles—Production of steel in openhearths and the maintenance of that type of furnace as practiced in the West constituted the primary subject of interest to approximately 80 members of the American Institute of Mining and Metallurgical Engineers, Western Section Steel Committee, at their second regional conference Nov. 19.

In the technical sessions for which George B. McMeans, general superintendent of the Kaiser Steel Corp. at Fontana, Calif., served as chairman, O. A. Kresse, general superintendent, Columbia Steel Co., Torrance, Calif., and Barney Dagan, openhearth superintendent, Kaiser Steel Corp., Fontana, reported on "Cold Charge Practice in Openhearth Operations," and "Openhearth Fuel and Combustion Practice," respectively.

Relates Early Experiences

Mr. Kresse, who tapped the first heat for Columbia's predecessor company in 1910, detailed the evolution of the steel industry in the West which has produced so many openhearth shops operating on cold metal. He pointed out that the



Candle in the Window

A bright flame in a holly-wreathed window—a solitary candle tells the tale of the ageless beauty of Christmastide. Perhaps some passerby, his heart warmed by its cheery glow, will pause before the candle and see it for what it really is—a symbol of security and peace.

We hope that you, our customers and friends, will enjoy peace and security—that the spirit of Christmas will gleam in your daily lives through the coming year. For our part, we will do our utmost to deserve your continued confidence and friendship.—*The Wisconsin Steel Organization.*

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maintenance of steel quality to specifications presents special problems in these plants because of the higher quantity of residual elements from the scrap charge.

Among other things he pointed out that the Los Angeles area is very favorably situated in regard to the availability of scrap and that here the use of high percentages of scrap in openhearth operations can be adopted on an economically competitive basis.

Slides Illustrate Talks

J. T. Evans, research laboratory of National Supply Co. at Torrance, served as the openhearth chairman in the afternoon session during which Lester Burger, safety engineer of Columbia at Torrance, discussed "Single Objective Safety;" Clay Crawford, chief observer, Colorado Fuel & Iron Corp., Pueblo, spoke on "Metallurgical Aspects of Western Steel Manufacturing;" and W. K. Bowers, assistant superintendent openhearth, Kaiser Corp., Fontana, discussed "Open Hearth Operations and Rebuilding."

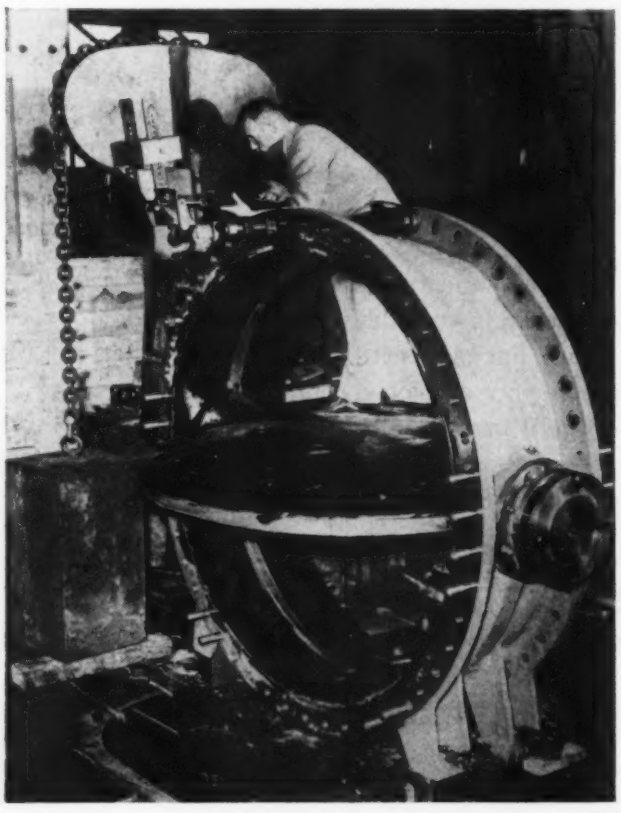
Extensive use of slides, drawings and illustrated tables considerably enhanced the interest of most of the talks.

Glenn Middleton, melting superintendent, National Supply Co., Torrance, conducted the forum on electric furnace practices in the West.

William A. Greene, metallurgical engineer, Kaiser Steel Corp., was recognized for having presented the best paper of the year before the local group. It was titled "Methods of Analyzing Refractory Consumption."

Hall L. Hibbard, vice-president and chief engineer, Lockheed Aircraft Corp., Burbank, Calif., addressed the organization on the subject, "Adventures in Space."

George B. McMeans is permanent chairman; John T. Oursler, openhearth superintendent, Columbia Steel Co., Torrance, is executive chairman and served as conference chairman; J. T. Evans is vice-chairman; and W. E. Daugherty of Laclede-Christy is secretary.



BUTTERFLY: Shown is a 72-in. butterfly valve which is being tested at the Sunnyvale, Calif., plant of Westinghouse Electric Corp. The valve will be installed at the Santa Barbara Dam in Mexico. Other equipment for foreign hydraulic projects now under construction at the plant includes butterfly valves for the Santa Teresa and Danxho Dams in Mexico.

Shipyard Enters New Field Of Rebuilding Railroad Equipment

Seattle—From shipbuilding to the repair and rebuilding of railroad engines and cars is a big step but apparently Puget Sound Bridge & Dredge Co. has made it successfully.

With ship construction a thing of the past and repair activity at an extremely low ebb, Puget Sound several months ago decided to enter this new field by making a bid on work for the Alaska railroad. There was some doubt expressed by skeptics that this company inexperience in that field would be able to profitably do the work at the bid price. However, apparently experience is proving otherwise and the same men that once built and repaired ships are now rebuilding 23 passenger cars and five locomotives. Contract price was $1½ million.

Converts Old Switchers

The locomotives being repaired were originally used in military service in Iran during the war and are old style road-switchers of 650 hp. Puget Sound is converting these into sleek streamlined engines of 1000 hp and the old six wheeled, built-up trucks are being replaced with four wheel cast trucks. Elaborate insulation is being installed as well as temperature controls and engines are being shrouded with ⅛ in. steel plate which is being shaped in jigs using standard marine engineering technique. Each locomotive will be equipped with a snowplow. These five were included in the original contract with three more coming in as a separate job.

Cars which were originally built for hospital cars are now being remodeled into coaches, diners and mail baggage cars at a cost of $20,000 each.

In addition to retaining much of the shipbuilding technique in this operation the "hard-hats" insist on retaining the shipyard vernacular and call the cab of the locomotive the "wheelhouse" and identify parts of the cars and locomotives as "fore and aft."

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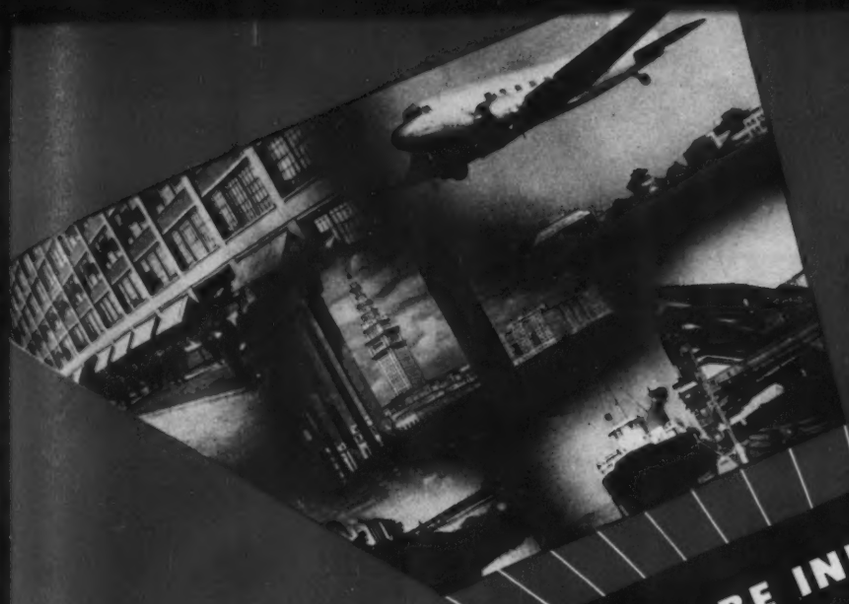

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Headquarters for the Meeting — Cleveland Public Auditorium — will be self-contained for an event of the scope of the 54th Foundry Congress and Show . . . a first class restaurant . . . attractive lounges . . . ample telephone facilities . . . suitable meeting rooms for the extensive technical program . . . ideal exhibit halls.

With hotel housing conditions back to normal, the 1950 A.F.S. Congress will attract the important influences from the foundry world, who will come to participate in events that will revolve around a Convention concentrated on **modernization and economy of production in the foundry.**

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THE FEDERAL VIEW

THIS WEEK IN WASHINGTON

Government officials recognize the need for a change in federal tax policies . . . Taft warns of fiscal problems created by pension plans . . . Holland requires U. S. goods.

by Eugene J. Hardy

Washington — Recognition on the part of some of the departments of the federal government that what business might need more than anything else is a change in federal tax policies has finally come about.

Admittedly, discussions now under way between officials of the Interior and Treasury Depts. and the Bureau of Internal Revenue concern only a segment of the domestic nonferrous mining industry, principally producers of copper, lead and zinc. The principle is most important, however, for anything that might be worked out to stimulate risk capital in these industries would have to be applied to all mineral mining, except possibly fuels.

Mining Problem Growing Acute

Then, too, if the federal government once admitted that its tax policies worked against stimulation of effort in these industries, it could not well deny that they similarly affect industry generally where it is becoming increasingly more difficult to uncover adequate capital resources.

The problems of the nonferrous mining industry have been growing more acute since the end of the war. Congressional remedies, fostered by pork-barrelling Western Congressmen, leaned almost exclusively to subsidies or premium payments and never got to the root of the problem, as has been done in other countries. In Canada, for example, to stimulate exploration, the tax laws provide for no taxes for the first 3 years after the initial capital investment.

Subsidy Legislation Shelved

During the session of Congress which closed last month legislation sponsored by Sen. O'Mahoney, Dem., Wyo. (S. 2105), passed the Senate, but was locked up in the House Rules Committee. This measure would, for a trial period of 3 years, authorize the government to pay up to half of the costs of prospecting and development work or to purchase minerals or metals at premium prices. If such commodities were not transferred to the stockpile, they could be resold on the open market at prices that would return to the government the average price paid. The law would be administered by a Minerals Conservation Board, consisting of the Secretaries of Defense, Commerce, Treasury and Interior.

The departments concerned, principally Interior, were none too happy over this measure because of its implied federal control of domestic mining policies. Interior officials, however, recognized that from a national security standpoint, something had to be done to stimulate exploration, reopen distressed mines, and prevent others from closing down, since once closed down, many mines become economically impossible to reopen.

Tax Structure Studied

The initiation of conferences between the various government departments relating to changes in the tax structure came as a natural consequence. The mining industry has also been cooperating in this effort. Thus far the job has been largely one of information-gathering. The Canadian situation is being studied. Greater depletion allowances are also being considered. Whether anything

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can be done administratively within present laws is not yet known. It may be that Congress will still have to be asked to make some special provision in the tax laws, which are slated for a general going-over during the next session of Congress.

Sen. Taft Warns Congress Over Widespread Pension Plans

Senator Taft, Rep., Ohio, in a radio address to his constituents, has served warning on Congress that the widespread quest for pensions on the part of organized labor will create untold fiscal problems for both government and business. In asking the question, "Why not $100 a month for everybody at age 65," the Ohio statesman lifted the lid on the Pandora's box that has been placed squarely in the laps of American business.

While there are still many unsolved problems regarding the administration of pension funds in the industries that already have fallen into line, these would pale into insignificance if industry-financed pensions should eventually cover upwards of 40 million employees of American business.

Financing Problems Appear

One of the more important problems bothering economists in government and business is the question of financing. If pensions are financed out of current production by means of higher prices to consumers, what will happen in a period of declining business? Certainly, the federal government, regardless of its political complexion, would not stand by and see millions of workers lose their pensions while other millions are losing their jobs. Such a situation would delight the hearts of the left-wing planners, whose arguments for a controlled economy would be hard to combat in any period of depression.

The other alternative is funded pension reserves, but the economic and social implications of such tremendous sums are almost beyond comprehension. While no government expert will venture an estimate of what this amount would be if pensions spread throughout business and industry, corridor talk around Washington deals with tens of billions of dollars in not too many decades.

Reserves Prove Burdensome

Such large funded reserves would put too much of the national income into fixed obligations and create serious problems in the equity financing markets. Should the trend toward investment in government securities continue and pension funds are used for this purpose, industry might find itself financing government ventures wholly out of sympathy with its general views.

Only one thing is certain at this time. There will be strong moves to have the federal government take over the whole problem of adequate social security. First step in this direction will be pressure for Senate passage of the House-approved social security expansion measure.

THE BULL OF THE WOODS — By J. R. Williams

WELL, TH' DOC SAYS I'M ALLERGIC -- I GET A THOUSAND CHILLS A DAY HANDLIN' TH' COLD HANDLES ON THIS MODERN MACHINE! NOW I GET A THOUSAND CHILLS A NIGHT WHEN I'M HOME IN BED, SO I'M TRYIN' SOMETHIN'!
I NOTICE TH' BULL NEVER LAUGHS AT TH' SILLY STUFF SOME OF US THINK IS FUNNY!
I DON'T BLAME HIM -- SILLY STUFF CAN START A DEMAND FOR EXPENSIVE WOOLEN MITTENS, OR EVEN PLUSH, ON ALL COLD STEEL HANDLES!
12-2
J.R.WILLIAMS
WINTER WOOLENS
T. M. REG. U. S. PAT. OFF.
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Holland's Industrialization Program Requires U.S. Goods

Indications are that for the next 5 years or so, Holland will be a steady customer for industrial machinery and equipment, including machine tools and other metal-working machinery.

On the basis of Embassy information, this market will amount to about $200 million a year, of which more than half must come from foreign sources, mainly the United States.

Holland is well on the way to becoming one of the most highly industrialized nations of Europe. All postwar efforts have been in this direction—with the ultimate goal of becoming an important factor in the export trade.

Another factor is that each year 40,000 new workers are coming into the Dutch labor market, plus an additional 3000 who lose out to mechanization and increasing productivity.

Some Engineering Aspects of Nodular Cast Iron

By C. R. AUSTIN
Assistant to President,
Meehanite Metal Corp.,
New Rochelle, N. Y.

MUCH attention has been directed to the control of graphite form and distribution in iron castings during the past quarter century, since it is recognized that engineering properties of the castings are dependent both on these graphite characteristics and on the matrix structure of the metal. This recognition ultimately led to the development of ASTM specifications in terms of standards of graphite flake size and orientation and of minimum tensiles.

It is natural that further efforts should be directed to as cast irons having higher tensile strengths and general property characteristics comparable with those obtained in the nodular graphite pearlitic irons known as malleable castings wherein the properties are developed only after a rather long heat treating cycle.

Production of nodules or spherulites instead of flake graphite directly from the molten complex, has intermittently received the attention of metallurgists. It is only recently, however, that efforts have been made to encourage engineers to give attention to these structural modifications despite the fact that the possibilities of producing these structures in association with increased tensile properties has been recognized for many years. Some of the history of these developments has been previously outlined.[1]

SUMMARY: Some engineering aspects of the Meehanite nodular irons having particular influence on various applications of this material are discussed by the author. Extensive data on microstructures and physical properties, and results of dynamometer tests of nodular iron brake drums are given. Examples of castings which have been produced in this material are illustrated.

It is the purpose of this article to present some thoughts on the engineering aspects of the subject and to provide a few examples of the pearlitic nodular castings which are being placed in service with a view to determining the possible role these irons will play in engineering production.

A considerable period must elapse before adequate data can be accumulated on service behavior of this material in various engineering applications. To this end several Meehanite foundries have manufactured many varieties of castings in Meehanite nodular iron which are being tested to appraise possible useful engineering applications under both static and dynamic conditions.

The potential market for nodular iron will be dependent partly on the establishment and maintenance of precise foundry control during the production of these castings. This control must extend from the charging of raw materials to processing and final founding of the casting. The final foundry operation, including as it does the technology of metal cleanliness with complete soundness and casting uniformity, is dependent on the use of proper gating and risering techniques as well as casting design features peculiar to the characteristics of this metal. Failure to observe these controls may lead to misruns, slag contamination, blow holes, or casting shrinks.

The principles evolved in the Meehanite process of making engineering iron castings have been particularly important in basing the new techniques for the manufacture of nodular Meehanite castings. Some aspects of the metallurgy and physico-chemical principles of the aforementioned process have been previously discussed by the writer.[2]

Nodular or spherulitic iron is not one simple or single metallic product. Two extremes should be noted: (1) Pearlitic nodular iron in which the matrix structure is essentially laminated pearlite; and (2) ferritic nodular iron in which the matrix consists largely of relatively soft silicon-ferrite.

The microstructural difference between the pearlitic and ferritic nodular irons is illustrated in figs. 1 and 2. The structure of the pearlitic iron shown in fig. 1 gave a tensile strength of over 100,000 psi and a hardness of 276 Bhn. Comparable structures prepared from ferritic nodular iron (see fig. 2) produced a tensile strength of about 80,000 psi with a hardness of 170 Bhn.

The mechanical properties of these two materials are quite different, being particularly pronounced in terms of yield strength, toughness and bendability as well as hardness, with the associated physical characteristics of machinability and resistance to galling, seizing, and wear. Variations of these properties are dependent on the base iron used for nodularizing treatment, on the specific nodularizing element or alloy added, on the rate of cooling, and on the dimensions of the casting manufactured. These properties can be further modified by heat treatment.

The reaction to quench hardening is most clearly revealed quantitatively by use of the Jominy end-quench test. Fig. 3 shows the results of a series of tests conducted on Meehanite

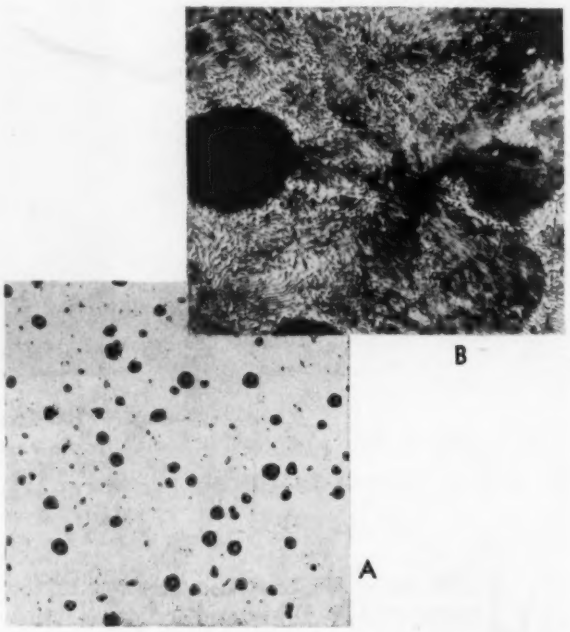

FIG. 1—Typical microstructures found in Meehanite nodular pearlitic irons. (A) unetched, 100X; (B) etched, 600X.

nodular irons ranging in tensile strength from about 95,000 to 105,000 psi. The harder nodular irons exhibit deeper hardening characteristics (No. 1 and No. 4) while the softer irons are more shallow hardening (Nos. 1X, 3X and 5X). The difference between the hardenability of these two series can be ascribed mainly to manganese content of the irons; series No. 1 and No. 4 contained about 0.85 pct Mn, while series 1X, 3X and 5X contained 0.45 pct Mn.

With similar chemical analysis in a series of nodular castings a hardenability range comparable with the hardenability bands so well recognized in specifications on fabricated steels may be anticipated.

Brinell hardness, taken on the quenched end

[1] *See "Some Notes on the History of Nodular Irons,"* THE IRON AGE, *May* 19, 1949, *p.* 100.

[2] *"Role of Meehanite Metal Castings in Engineering Production," Transactions, ASME, Feb.,* 1948, *pages* 99-109.

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TABLE I

Jominy End-Quench Characteristics of Meehanite Nodular Iron Castings.

Mark	Maximum Bhn	Jominy Index (J45)*
1	600	14/16
4	627	15/16
1X	627	14/16
3X	652	10/16
5X	652	9/16

* Distance from end of Jominy bar at which 45 RC is obtained, in sixteenths of inch.

of the 1 in. diam nodular iron test bars, using a tungsten ball with 3000 kg load, along with the Jominy index of hardenability (J45), is given in table I.

It should be clear that the use of the simple designation *nodular iron* has limited engineering significance since the term nodular iron has little property significance engineering-wise except that the tensile strength is at a level well above, to a noteworthy degree, that of a good high strength flake graphite cast iron. The tensile strength, however, may vary within the range of perhaps 70,000 to 110,000 psi although lower and higher tensile values have been obtained.

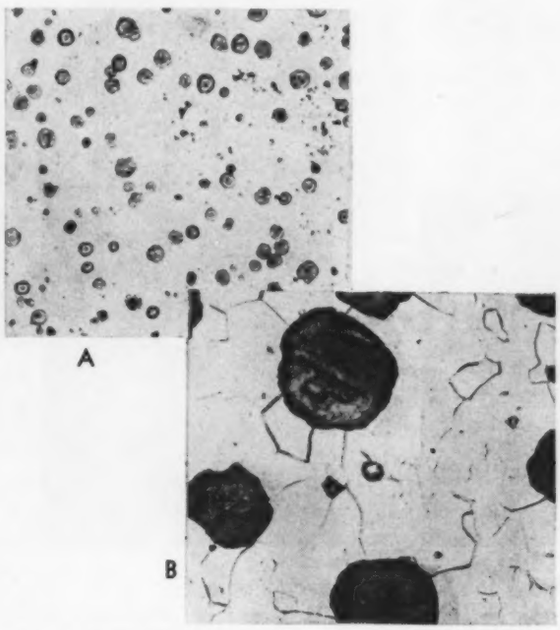


FIG. 2—Typical microstructure found in Meehanite nodular ferritic irons. (A) unetched, 100X; (B) etched, 600X.

It is not to be implied from this observation that the variations in tensile properties of a given nodular iron made under specified procedure are likely to vary markedly in tensile strength in the test bar, but rather that variations in base metal and in methods of nodular treatment may promote this spread in properties, independent of problems of correct founding of the material. As greater experience is gained in the manufacture and control of properties of the irons, engineering specifications must be developed as a guide to service application and engineering design.

Table II shows the chemical and physical properties of typical Meehanite nodular castings manufactured for service tests. These particular castings were pearlitic and exhibited about 2 pct elongation under tensile stress. This value of elongation, while sufficient and fully satisfactory for many engineering design purposes, renders the use of the term ductile iron as both unfortunate and tending to be misleading.

It is quite practicable at present to produce irons with relatively high tensile elongation from selected materials by melting in an electric furnace, and even with cupola iron under special conditions. However, at the moment these conditions lack the more economic aspects of pearlitic nodular irons. Increased ductility can be induced by heat treatment methods, but again, this extra operation tends to militate against the economic balance between nodular iron castings and other metals with inherent ductility.

One of the Meehanite foundries is manufacturing these nodular iron castings on a commercial basis to the specifications shown in table III.

It has been shown that Meehanite nodular castings respond to quench hardening, and data presented in table IV demonstrate the effectiveness of an interrupted quench treatment on markedly raising the tensile properties, with only moderate increase in the hardness. The castings were heated to 1600°F, quenched in a bath at 600°F, and then air cooled. From the 1 in. sq by 6 in. long test blocks so treated, standard 0.505 in. diam gage sections 2½ in. long were machined for tensile tests. An index of yield strength was obtained by the beam drop of the testing machine.

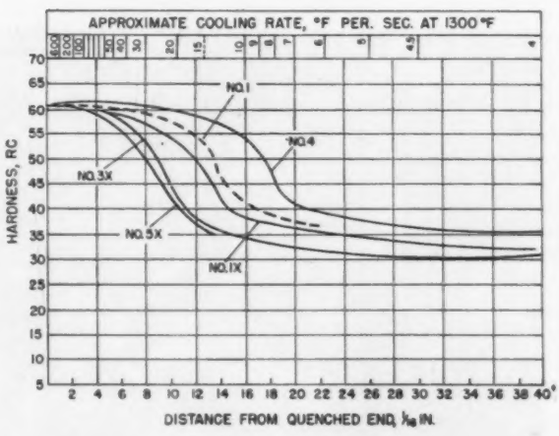


FIG. 3—Hardenability characteristics of Meehanite nodular iron as indicated by Jominy end-quench test. Comparisons of Bhn on the quenched end and Jominy hardenability index are shown in table I

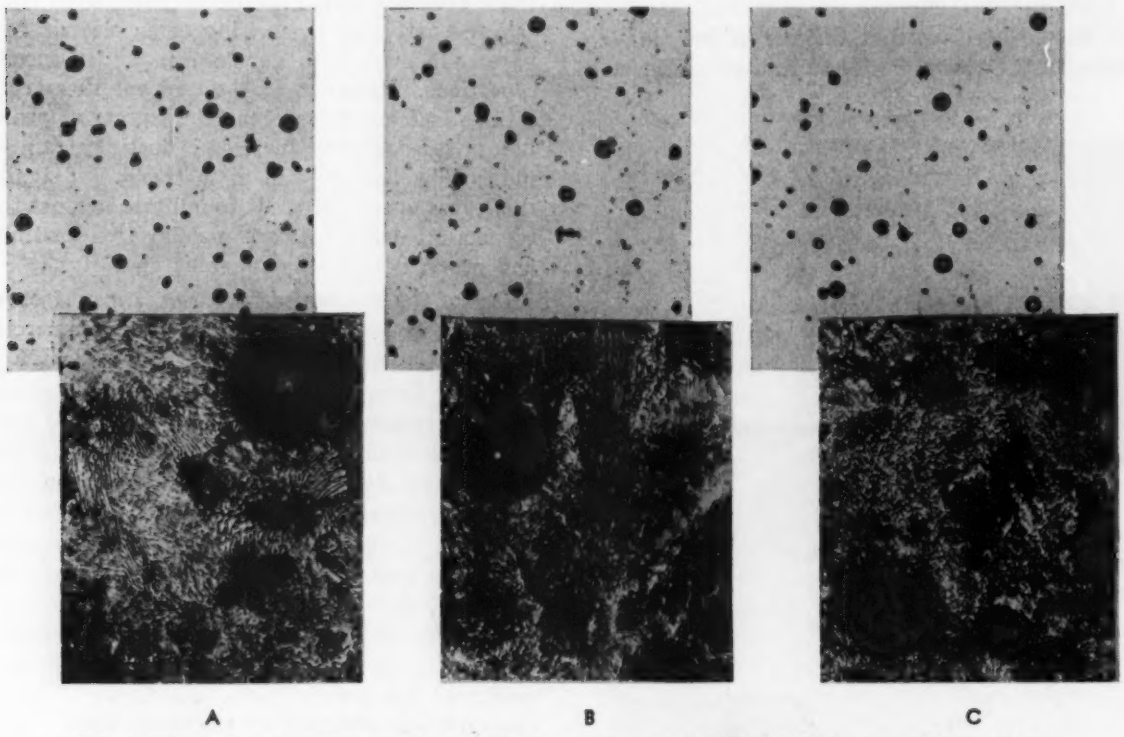
The noteworthy increase in tensile strength of the castings up to 150,000 and 170,000 psi should be considered in association with high yield strength and 4 to 6 pct elongation on 1 in.

Dynamic properties of importance to the design engineer include impact and fatigue strength as influenced by notch sensitivity, as well as damping capacity of the metal. Some relative values are given in table V.

The role of phosphorous in relation to shock resistance is similar to that found in flake graphite irons. The endurance ratio with unnotched bars is considerably greater than for flake graphite iron. However, the nodular iron is much more notch sensitive, and considerable detailed study is warranted in assaying the importance of notch effect.

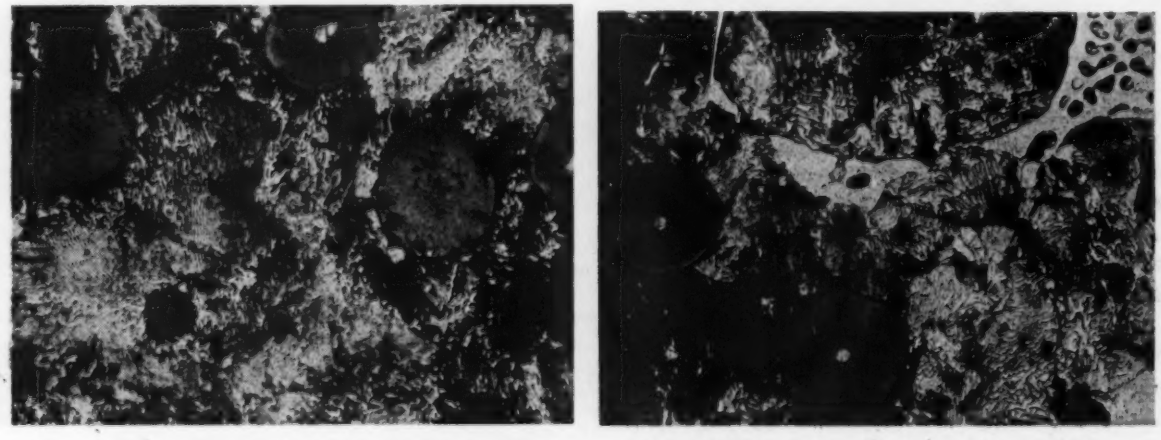
Figures are also included for compressive strength. The lower figure was obtained on a ferritic nodular test bar in the form of a cylinder 1 in. diam and 2 in. high. The value for pearlitic nodular was about 180,000 psi.

Low damping capacity is quite important when considering applications under repeated impact load or under conditions where overstress may intermittently occur. The figures given in table



A B C

FIG. 4—Distribution of graphite nodules in brake shoe sections of (A) 3/8 in., (B) 5/8 in., and (C) 1 1/4 in.; unetched, 100X. The etched, 600X, micros illustrate the similarity in structure obtained in the three sections.



A B

FIG. 5—(A) Nodular structure with pearlitic matrix found in 1 and 2 in. sections of a casting, and (B) free cementite found in a 3/4 in. section of the same casting; etched, 600X.

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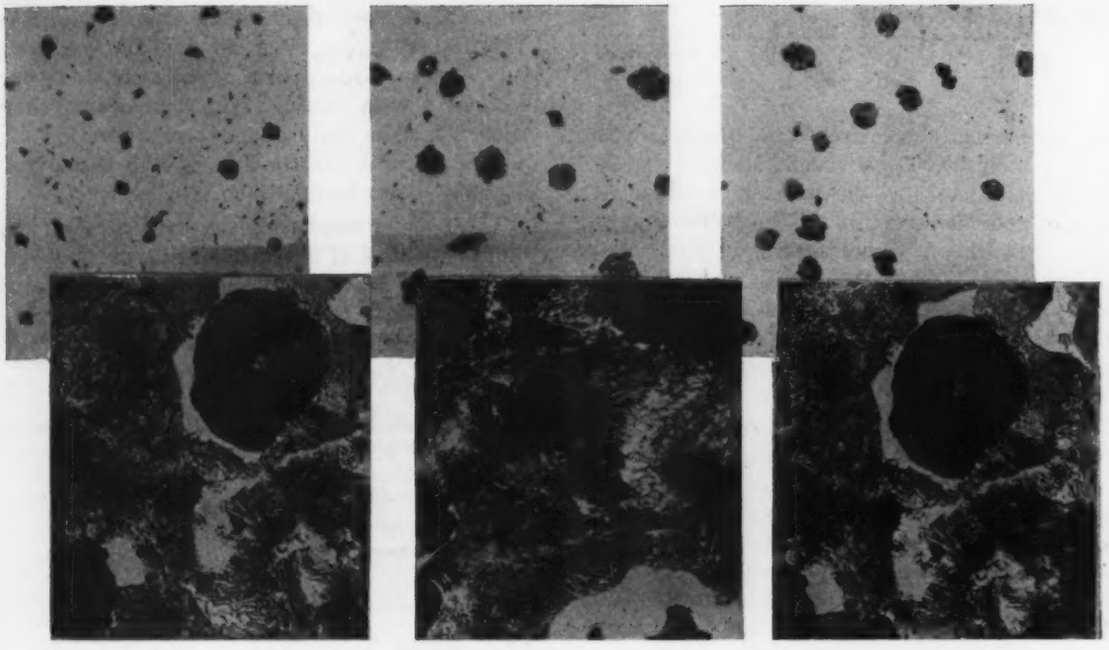

FIG. 6—Microstructures taken from 1.2, 4, and 6 in. sections showing properties given in table VI. Unetched, 100X; etched, 600X.

V were obtained in torsion test at a surface shear stress of about 22,000 psi.

The effect of section size on the strength of a casting is important and information can be presented correlating the particular iron treated and the sensitivity to casting section. In general, control of structure and accompanying property characteristics is more readily accomplished in heavy sections than in castings having light sections poured in nodular iron. This renders the control and measurement of constitution (see patent No. 2,371,654) of iron particularly important in castings with light sections.

Fig. 4 shows distribution of the graphite nodules in ⅜, ⅝ and 1¼ in. sections taken from different portions of a brake shoe cast in 100,000 psi Meehanite nodular iron with 6590 lb transverse strength on a standard 1.2 in. diam bar tested over 18 in. length. The uniform nature of the structure and hence the properties of the casting are quite evident.

TABLE II

Chemical and Physical Properties of Typical Meehanite Nodular Castings.

No. of Castings	TC	Si	Mn	P	S	T. S., psi	Bhn
2	3.83	2.80	0.95	0.083	0.009	99,000	285
2	3.62	2.21	0.81	0.094	0.011	105,000	269
2	3.54	2.34	0.97	0.088	0.008	102,000	293
5	3.56	2.28	0.90	0.088	0.016	102,000	255
2	3.34	2.41	0.92	0.092	0.013	102,800	277
3	3.34	2.34	1.03	0.102	0.012	100,500	285
1	3.02	2.32	0.92	0.104	0.004	106,500	269
3	3.48	2.43	1.04	0.098	0.002	96,000	293
1	3.84	2.42	1.07	0.088	0.014	103,200	255
3	3.88	2.62	1.07	0.101	0.011	96,000	269

TABLE III

Physical Property Specification for As Cast and Annealed Meehanite Nodular Castings.

	Modulus of Elasticity, psi	Yield Strength, psi	Tensile Strength, psi	Elong.	Bhn
As Cast	23 by 10^6	70,000	90,000	1 pct	250
Annealed	21 by 10^6	35,000	65,000	10 pct	170

Two examples can be cited where the constitution of the iron was (a) too low and (b) too high for the particular castings poured.

In case (a) the ¾-in. section was almost completely nodularized to a tensile strength of about 95,000 psi, but the section slightly greater than 1 in. was essentially flake graphite in a pearlitic matrix and gave a tensile strength of 62,000 psi.

TABLE IV

Response of Meehanite Nodular Castings to Interrupted Quench Treatment.

Property	Casting Designation D2	2Y	3Y
C	3.86	3.86	3.84
Si	2.28	2.42	2.40
Mn	0.9	0.44	0.48
P	0.098	0.032	0.034
Cast Tensile, psi	105,300	103,850	67,200
Bhn	269	255	228
Treated Tens., psi	149,200	170,600	149,100
Yield Str., psi	85,800	115,000	94,000
Elongation, 1 in.	4 pct	8 pct	4 pct
Bhn	361	364	361

The 2-in. section was entirely flake graphite with approximately 50,000 psi tensile strength.

Case (b) illustrates the manner in which an excellent nodular structure with pearlite matrix, shown in fig. 5A, in 1 and 2-in. sections having a 277 Bhn may be compared with a hard (351 Bhn) and relatively brittle ¾-in. section in the same casting. The free cementite in the ¾-in. section, as shown in fig. 5B makes machining extremely difficult.

Mass effect in heavy sections results in progressive lowering of the tensile strength with increase in section size. With control of constitution, despite this fall in strength, some uniformity of properties can be maintained throughout various regions of a heavy section. Thus, an iron of suitable predetermined constitution was fully processed for nodularization and poured into 1.2, 4, and 6 in. diam casting sections. Tensile test pieces were cut, and hardness traverses were made across a polished transverse section of each casting. The data are given in table VI. The nature and comparison of the microstructural constituents of the three castings are shown on fig. 6.

These facts emphasize the care necessary in foundry control of the nodularizing process when variation in casting section is to be considered, involving as it does variation in tensile properties and toughness of the iron as well as the vital problem of machinability characteristics.

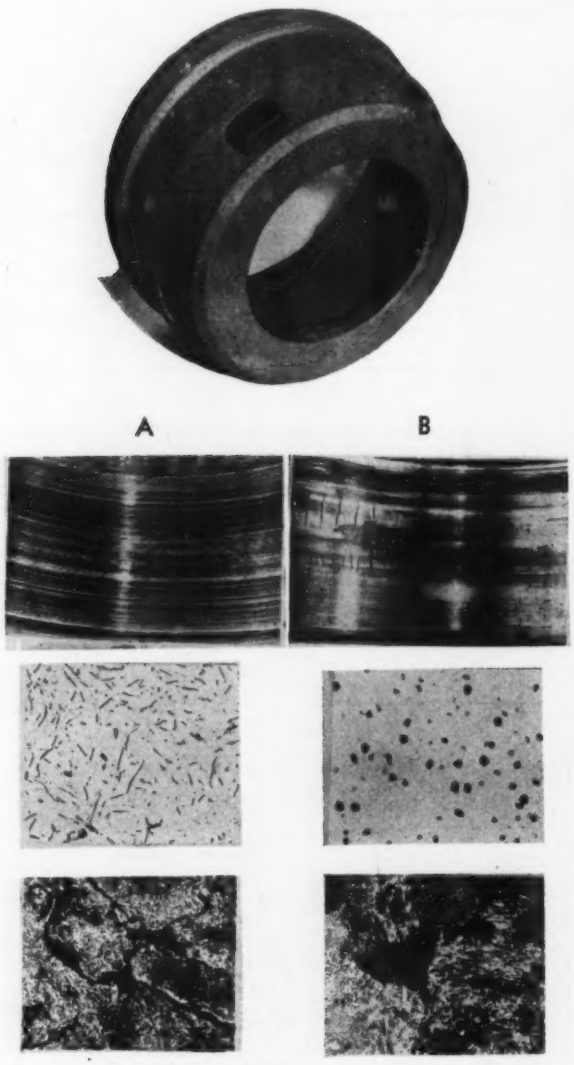

FIG. 7—A 15-in. diam pearlitic nodular brake drum. Braking surface after testing is shown for (A) a standard Meehanite drum, and (B) for the nodular brake drum. Corresponding microstructures are also shown. Unetched, 100X; etched, 600X.

TABLE V

Comparison Characteristics for Nodular Iron Castings

Percent Phosphorus...	0.024	0.29	0.57
Impact Ft-Lb	35	17	8

Type Iron	Nodular	Type GE - GM Meehanite Metal
Endurance Ratio Unnotched...	0.46 - 0.59	0.38 - 0.45
Compressive Strength, psi.....	126,250 - 179,500	120,000 - 200,000

Material	Type GC Meehanite Metal	Nodular Graphite	Mild Steel
Spec. Damp. Cap.	25 pct	6 pct	2 pct

While basic properties serve as an important foundation for materials selection, service performance is still the determining factor, particularly where dynamic forces are operative. This fact is well illustrated in crankshaft materials, where such properties as elastic modulus, yield strength, endurance limit, damping capacity and notch sensitivity in terms of localized stress concentration are all of paramount importance in design and performance. However, it is still impracticable to assign what may be termed an order of merit for the several properties listed.

Crankshafts have been cast in high tensile flake graphite irons, in acicular irons, and are now being considered in nodular irons. In the order listed, there is a marked increase in tensile strength as well as some increase in yield strength, assuming that low ductility fully pearlitic nodular iron is to be considered. Similarly, the endurance or fatigue properties are progressively higher from flake through acicular to nodular graphite castings.

On the other hand notch sensitivity and local stress readjustment appear to operate in the reverse direction, and damping out of vibrational stresses built up in service is profoundly less effective in the nodular than in flake graphite irons.

Another interesting example of materials selection refers to brake drum materials. A preferred

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TABLE VI

Strength and Hardness Values for Meehanite Nodular Structures shown in Fig. 5 in Relation to Section Size.

Size	1.2 in. Dia.	4 in. Dia.	Edge	6 in. Dia. Mid. Radius	Center
Tensile, psi	118,000	92,000	87,000	87,000	87,000
Bhn	293	277-285	.....	277-285	.....

graphite flake size and distribution, along with a controlled and specific matrix structure, has been established as a result of years of service test. From these tests, tensile strength, amount and distribution of the flake graphite, and nature of the matrix structure now serve as the specifications and displace all controversy on optimum conditions of hardness, modulus, etc. Resistance to heat checking is perhaps the prime consideration, but it is difficult to assay the role of the various mechanical properties in providing maximum service life.

Many varieties of castings of nodular iron have been manufactured in different Meehanite foundries more especially for the purpose of collecting data on service records.

Preliminary tests obtained by Timken-Detroit Axle Co. on their brake drum test dynamometer, for the purpose of comparing the wear qualities and heat checking characteristics of the drums, are enlightening.

For the tests to be illustrated, the nodular iron brake drum shown in fig. 7 was suitably machined and tested in the following manner:

(1) The brake assembly was set up on the inertia brake drum dynamometer. All parts were inspected for proper fit clearance and assembly. Lining to drum clearance was adjusted to 0.006 in. running clearance.

(2) Tests were run as follows:

Stops Nos. 1 to 100 Run in

Stops Nos. 101 to 180 at 20 mph performance test

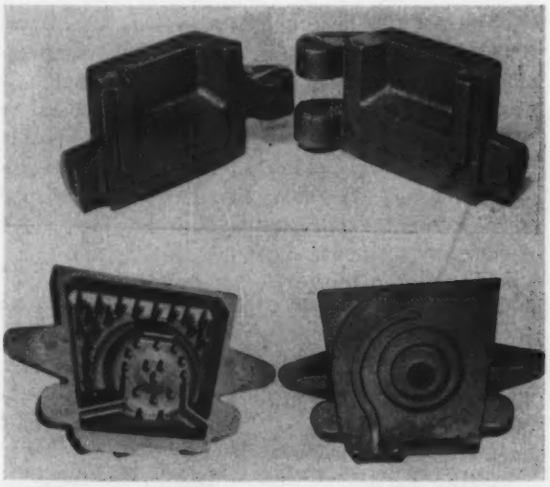

FIG. 8—Permanent molds made of nodular iron, which must withstand high temperature and thermal heat shock.

Stops Nos. 181 to 260 at 30 mph performance test

Stops Nos. 261 to 340 at 40 mph performance test

Stops Nos. 341 to End at 40 mph wear test with 11 ft per sec^2 deceleration. The end was taken at 1580 stops.

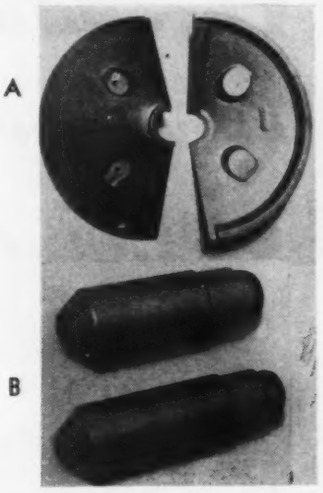

FIG. 9—Two halves of a 12 in. Wheelabrator cone (A), which is subject to abrasive conditions; and (B) two injector nozzles 3½ in. diam and 11 and 12½ in. long respectively.

The appearance of the braking surface of a type GD Meehanite drum after testing is shown in fig. 7A. The appearance of a nodular iron drum similarly tested is illustrated in fig. 7B. The relatively high susceptibility of the nodular drum to thermal checking, which ultimately leads to mechanical failure, should be noted.

Since experience has shown that a pearlitic matrix is most successful in brake service, a pearlitic nodular cast iron drum was used in the tests. Metallography of the two types of drums is aslo show in fig. 7.

Many other nodular iron castings have been manufactured in Meehanite foundries, including such items as the following:

(1) Lifting clamps for handling heavy ingot molds, pump rocker arms and hangers, for applications requiring high strength;

(2) brake shoes, Wheelabrator hooks, and muller plow shakeout hammers, where toughness or resistance to failure under impact stresses is a criterion of serviceability;

(3) brake drums, fire grates, permanent molds (fig. 8), and pig beds, where resistance to high temperature or thermal shock is a determining factor; and

(4) Wheelabrator cones (fig. 9A), injector nozzles for liquid metal (fig. 9B), and beater points for sand plants, where resistance to abrasion is a factor.

These castings provide examples of products which must be submitted to performance tests under a variety of service conditions in order that a true perspective of nodular iron castings can be developed in terms of an engineering material.

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Chromium Plated Cylinders Increase Capacity Of Lightweight Engines

THROUGH the use of chromium plating directly on the aluminum cylinder bore in the new two-cycle gasoline engine now in production as the Mall model 10-A, the size, weight and price of these portable engines can be cut at least 30 pct and at the same time their usable horsepower rating is increased an equal amount. The engine is the first volume-produced design of this type based on the advantages of plating chromium directly on the cylinder bore, a practical redesign feature that offers economies derived from improved methods and materials.

The plating process*, developed at the Olean, N. Y., laboratories of Van der Horst Corp., produces a bimetal material that permits the economies cited. The process is essentially a method of producing on the cylinder walls a hard electrolytic chromium finish that is rendered porous at the surface for retention of lubricant.

* *See "Porous Chrome Plating Engine Cylinders," by H. Van der Horst,* THE IRON AGE, *July 8, 1943, p. 71.*

While the advantages of this new design appear startling, they have been substantially exceeded in designing the new power source for Mall one-man and two-man chain saws, bow saws, cement agitators and railroad track maintenance equipment. The model 10-A engine, as compared with a previous model, actually produces 32 pct more horsepower, weighs 40 pct less, is equivalently smaller and more compact, and is listed to sell 35 pct lower.

It was during a change from the use of cast iron to aluminum cylinders in the Mall model 7 engine that the Van der Horst chrome plating process was first tried in 1944. The object was to eliminate the use of a pressed-in steel sleeve which acted as a heat dam over which most of the heat had to be forced out through the head.

Because of this characteristic, inherent in all sleeves whether pressed or cast in aluminum cylinders, the engine could be made to produce only four usable horsepower. But, a thin layer of special chromium atomically bonded directly to the aluminum immediately opened the way to develop 7 hp without any change in the bore, stroke or rated rpm.

The pioneering experience with the model 7 formed a criterion for designing model 10-A to take advantage of the advanced characteristics provided by the Van der Horst process. The object was to obtain at least five usable horsepower, a dividend of 1 hp over the usable output originally delivered by the model 7, but with new economy in size, weight and cost.

The displacement was reduced some 34.5 pct, being 7.95 cu in. in the model 10-A as compared with 12.18 cu in. in the former engine. This was done by shortening the stroke from 2¾ in. to 2 in. and closing the bore from 2⅜ in. to 2¼ in. These comparisons are shown in fig. 1.

The immediate mechanical effect was to reduce all engine dimensions accordingly, which was reflected in reduced material costs, machining time, handling, scrap loss and general overhead.

Even so, the design limits of this functional bimetal were deliberately avoided. The compression ratio was held to approximately 5:1. It might easily have been lifted at least two ratios were it not that these engines are called upon to handle whatever fuel and lubricant may be available in any out-of-the-way timber camp, railroad spur, farm or construction job on the North American continent. That means they must likewise operate at temperatures ranging from 120° to –50°F and at atmospheric pressures varying from timberline to below sea level.

Likewise, the fit between piston and cylinder, which might have been 50 pct closer, was set at 0.002 in. Even that is 3½ times closer than could be held with steel sleeves because of their poorer heat diffusion and consequent distortion from hot spots. Sleeves go out of round and separate from the cylinder, allowing an insulation of varnish to

SUMMARY: A portable engine used for one-man and two-man chain saws, bow saws, and other similar uses, was redesigned to take advantage of porous chromium plating of cylinder walls, with the result that size, weight and cost were reduced about 30 pct and the rating of the unit increased 32 pct. Factors influencing this new design are discussed, as are the various steps in processing the cylinders.

By A. W. MALL
President,
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Chicago

accumulate between, as shown in fig. 2.

With the chrome-on-aluminum, because the plating of special chromium is of negligible thickness insofar as heat transfer is concerned, the aluminum piston and aluminum cylinder can be so balanced, by selection of the alloys of which they are made, that they will expand and contract almost exactly together. Experimentally, an engine with just enough clearance to allow a piston without rings to be pushed in when cold, performed satisfactorily and pulled its full load.

A part of the reason for this is the special feature of Van der Horst chrome that in a final phase of the plating process the chrome surface is rendered porous to retain oil. Inasmuch as cylinder lubrication in a two-cycle engine with crankcase under compression is achieved by mixing the lubricant with the fuel, the existence of this porosity can be seen to coincide with this principle and to assist in continuous replenishment of the oil film.

At the same time, the porosity, in the form of minute reservoirs evenly dispersed throughout the honed cylinder wall, reduces the total contact surface and thereby cuts down frictional resistance. Since chrome itself has the lowest coefficient of friction of any cylinder material, the drag of these special bimetal cylinders to the movement of the piston assembly is minimized.

For that reason, and the previously cited closer fit, the complement of piston rings was reduced from three to two in the model 10-A. Blow-by, of considerable importance from the standpoint of port coking, fuel efficiency and crankcase compression, are adequately held by this combination of only two rings and a piston clearance of 0.002 in.

The model 10-A operates at a rated 4500 rpm with a sparkplug gasket temperature below 300°F under severe climatic conditions. Its rated speed was boosted to 4750 rpm for a full load test. The rings remained free and no maintenance was indicated at 2000 hr. Even then, the maximum cylinder wear was only 0.0006 in. on the diameter.

The test results can be assumed as uniformly typical of all production engines. Processing the bore with porous chromium, instead of using

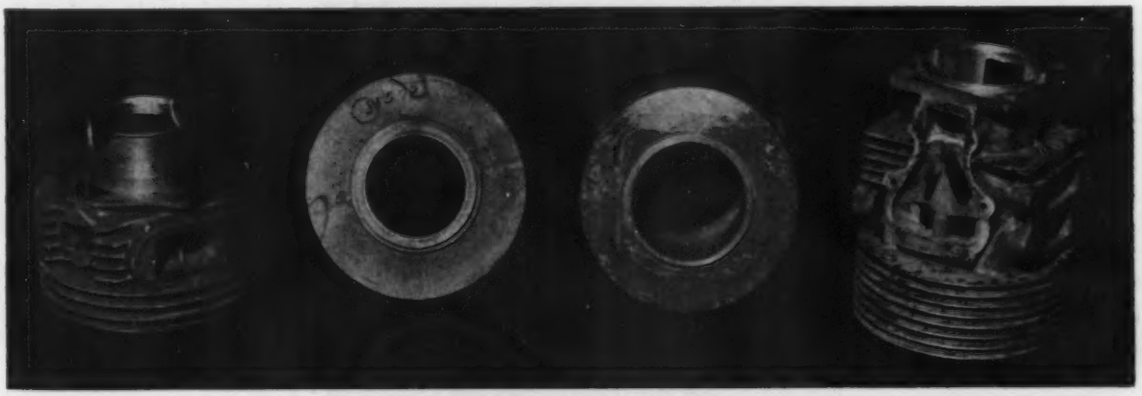

FIG. 1—A comparison between the new Mall model 10-A engine, left, and the model 7, shown at right. The reduction in size, weight, and cost with an increase in power was made possible by Porous-Krome plating of the cylinders.

liner inserts, permits full advantage from the consistent accuracy of diecasting. No longer is it necessary to compensate for inaccuracies by hand-filling the top edges of ports.

The metal cores used in diecasting not only locate and form accurately but produce a smooth surface that makes for lower frictional resistance to the flow of gases.

Therefore, in the model 10-A it was advantageous to design the gas passages for aerodynamic efficiency. In the main, this required opening up of the exhaust passages past the port to accommodate expansion of the hot gas. The smoothness and designed contour of the passage from crankcase to transfer ports likewise aided results. Such improvements, in their aggregate effect, raised the brake mean effective pressure above 53 psi.

A change to one exhaust port allowed further simplification and economy. It has proved unnecessary to equalize stresses by exhausting simultaneously from each side, because chrome-on-aluminum diffuses heat at a rate that avoids buildup of a hot spot on the exhaust side to distort the cylinder.

This rapid diffusion rate, coupled with better finning, made reduction of the parasite drag of the cooling fan from 1 hp in the original model to 1/3 hp in the model 10-A.

An undetermined amount of the amplitude of this cooling allowance derives from the high reflectivity value of chrome.

Against the honed chrome surface of the bore, more of the combustion heat is reflected back and put to useful work in gas expansion than would be in any other known cylinder material. At the same time, residual heat is dissipated more rapidly and with far more even distribution throughout the cylinder, even down to the flange itself. It may be noted that this, plus the exceptionally low frictional resistance of porous chromium, explains the known fact that many racing engines run substantially faster after such processing, without any other change.

The castings, produced in the Mall Tool Co. plant, are finished on both ends in a single operation and diamond-bored to ± 0.005 in. on the diameter and taper, and not over 50 microinches as to surface quality. The castings are then shipped to the plant of the Van der Horst Corp. for the chromium plating treatment.

The process of producing chrome on aluminum can be considered as having three general phases, in terms of the purpose of each in achieving end results. These general phases include chemical, electrolytic and mechanical operations. Whether singly or in overlapping combinations, they are employed (1) to effect an atomic bond between the chromium and the aluminum alloy base metal of the cylinder bore, and (2) to produce a chromium plate of desired thickness on the bore that will have the added functional characteristics, which distinguish it as Porous-Krome.

Both these end results are dependent, largely, upon proper conditioning of the base metal surface of the cylinder bore. This is a critical point insofar as plating chromium directly on aluminum is concerned according to Dr. Hendrik Van der Horst, who developed the process. Aluminum rapidly develops an oxide film over its surface. Not only must existing oxide be removed completely, but chromium must effect an atomic bond with the pure metal before the latter can begin to reoxidize.

In the first major steps of the process, for which proprietary rights are pending, the entire

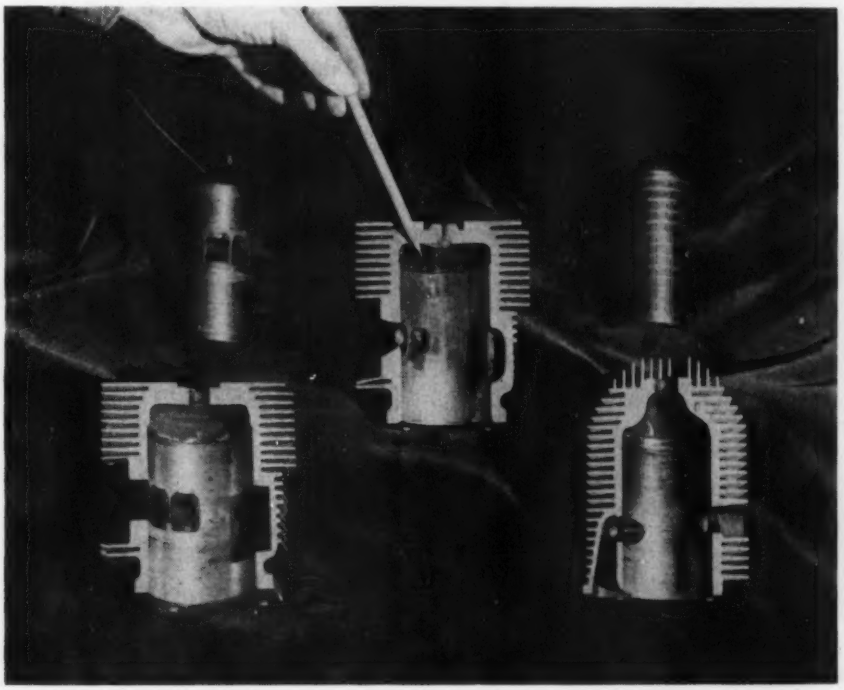

FIG. 2—These steel lined aluminum cylinders show the dissimilarity of the liner and cylinder material may cause the liner to pull away from the cylinder wall. This permits coking (see pencil) of the fuels between the liner and the cylinder, insulating the liner so that heat dissipation is retarded. Coking also occurs at the ports.

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FIG. 3—Five cylinders are loaded on a fixture for simultaneous chromium plating of the walls.

surface to be plated is treated to develop four optimum conditions. These may be listed in their order of increasing importance as follows:

(1) The grain structure of the base metal is exposed, presenting a minutely irregular surface geometry that offers, at approximately all points, the full tensile strength and structural support of which the base metal itself is capable.

(2) The degree of this irregularity is ample, when typically magnified by chromium during electrolytic deposition of the latter, to provide porosity of the chrome surface when finally finished.

(3) By its mechanical effect, this irregularity increases the security of the bond.

(4) Oxides and other foreign matter have been stripped away, exposing base metal to which chromium can be bonded atomically. This latter condition begins to deteriorate from the moment the new surface is exposed. In contact with air, it begins at once to reoxidize.

The forming of new oxide is held to a mere film of even thickness by recourse to chemical dipping. It is dissolved by immersion of the cylinder in a strong caustic solution in which enough sodium zincate (about one part in seven) is present to form a protective film, exceedingly thin and even, over the plating surface as the oxide is dissolved.

In turn, this protective film, which forestalls oxidation during transfer of the cylinders to the plating tank, is readily dissolved in a chromic acid solution such as the electrolyte.

The electrolyte is the same as that used for the processing by Van der Horst of 460,000 steel or cast-iron liners and cylinders for diesel en-

FIG. 4—Bores are air gage inspected for accuracy of dimension and finish. Porosity formation, bore finish and other bore characteristics are microscopically examined.

gines and compressors of all types. It contains trivalent and hexavalent chromium, sulfate, water and the usual traces of other elements. Maintained at 140°F, it is mechanically circulated to prevent uneven concentrations and insure uniform temperature.

In general, the current setup provides a range of 3.5 to 6 amp per sq in. of plating surface, under pressure of 6 v, from three-phase rectifiers grouped to provide 10,000 amp per tank. This produces an even deposition of chrome to desired thickness, at a working average of about 1.3 amp-hr per sq in. of surface for each 0.001 in. plated on the diameter.

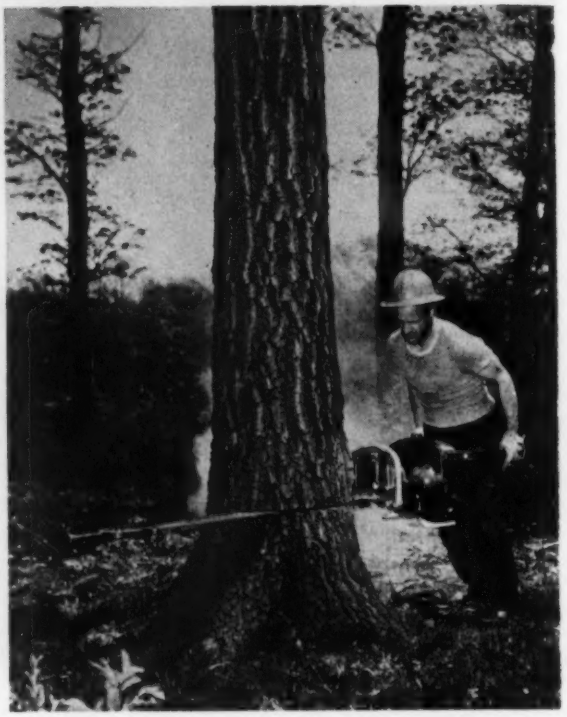
The fixture, in which this plating sequence is accomplished, handles five cylinders arranged in circular position. They are placed over lead-sheathed anodes. The cylinder skirts are inserted in a heavy plate, bored to center them in alignment with the anode carefully turned to a taper that controls deposition of the chrome in relation to the resistance factors involved. This loading fixture is shown in fig. 3.

Bus bar connections are integral with the fixture, which is rigidly constructed of heavy angle iron and steel plate. Once loaded, with the cylinders securely clamped in place, the fixture is up-ended on its trunnion mount and hoisted into the bath by electric crane.

After the final phase of plating, the cylinders are taken from the fixture and placed under vertical hones, set to finish the diameter and taper within 0.0015 in.

Within these limits, the surface irregularity of the chrome is honed through at approximately mid-depth, leaving oil pores that are evenly dispersed and occupy the desired percentage of the smooth contact area of the bore metal.

Inspection includes air gage calibration of the bore dimensions and microscopic examination of the porosity formation, its relative percentage of area, its depth, and the fineness of bore finish. The operator shown in fig. 4 is inspecting the plated bore, and an air gage is shown to his right. A check is also made of the port and skirt edges. The latter, previously ground to a 1/16-in. radius before plating, provides for tapering out of the chrome deposit instead of abrupt termination and possible treeing.



This one-man chain saw uses the Mall engine. This is a typical application of this type of engine.

Returned to the Mall plant in Chicago, the cylinders are assembled with other parts of the model 10-A to comprise a unit of packaged power that weighs 34 lb, including the external housing, fuel tank, operating handles, hot-spark magneto, air and fuel filters, muffler, control throttle and float-type carburetor for operation at any angle, and the hardened steel, spiral-bevel gears that apply the engine's power through a centrifugal type automatic clutch.

There are upward of 6000 of these engines already in the hands of users, operating Mall-made portable bow and chain saws up to 54 in. in capacity. Inasmuch as the model 10-A has not yet been publicly announced to the field, the existence of these 6000 units already in service demonstrates the ease with which price resistance is overcome when countered by designs that offer the economies derived from improved methods and materials.

BONDING ALUMINUM ON STEEL

AN aluminum-on-steel combination that gives promise of wide usage has been developed by Reynolds Metals Co., Richmond, Va., in which two strips of aluminum foil are applied to the top and bottom of a steel sheet. A fine iron coating is first applied to the steel by an electrolytic process to provide a permanent bond between the steel and aluminum surfaces.

The mill setup for handling application of this coating involves in a single continuous process passing steel strip from a coil through a cleansing bath, an electrolytic bath where it receives the iron coating, a furnace to heat it to about 850°F, and then between two strips of aluminum foil which are bonded to the steel by high pressure rolling. The aluminum-covered steel can then be further rolled to reduce its thickness as desired.

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Air-Hardening Tool and Die Steels

Distortion Factors, Internal Stresses and Hardenability

By C. B. POST

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SUMMARY: Consistently good results can be obtained with air-hardening tool and die steels, particularly in tools having intricate sections. Internal stresses resulting from water, oil and air hardening are discussed in this second part of a three part article, and a discussion of distorton factors and hardenability of air-hardening steels is also presented.

STEEP thermal gradients during the quenching operation in hardening steel lead to high internal stresses. These are primarily due to the formation of martensite in the interior after an outer envelope of martensite has formed, and become a more prominent factor in the successful quenching of steel as tool complexity increases.

From the preceding discussion of thermal gradients encountered in air hardening, it is evident that the internal stresses in steel after air hardening will be less than those found after water or oil quenching. Some measure of the actual internal stresses developed in steel after water, oil, or air hardening can be obtained by quenching cylinders in water, oil and air, using the method developed by Sachs.[4]

In part one, the author discussed general characteristics of air-hardening steels, and separated them into three classifications based on analysis and usage.—Ed.

This method is incapable of giving information concerning the internal stresses developed at corners, recesses, and sharp notches, but it does show the relative magnitude of stresses developed under actual hardening conditions in a regularly shaped object, such as a cylinder. Knowing the comparison of internal stresses developed during water, oil, and air hardening for the simple cylinder, some reasonable guesses can be made on the stresses developed at corners and recesses in commercial tools.

Cylindrical sleeves were made from a 0.90 pct C—1.75 pct Mn oil hardening steel, a 0.90 pct straight carbon water hardening steel and a 1 pct C—5 pct Cr—1.5 pct Mo air hardening steel. The sleeves were 3¼-in. OD, 2-in. ID, and 7 in. long. The cylinders were quenched in water, oil, or air hardened from their appropriate hardening temperatures. Following the quench, the sleeves were placed in boiling water to slightly

draw the steel and obtain reproducible results. Small layers were then ground off the outside diameter. After each grind, the changes in dimension of the inner and outer radii and length were measured. As subsequent layers were removed from the outside or inside diameter the change was measured, and it was possible to calculate the tangential and longitudinal stresses in the sleeves.

[1] *G. Sachs, "Zeitschrift f. Metallkunde," vol* 19, *pp* 352 *to* 357, 1927.

Fig. 4 shows internal stresses from the inner to the outer surface of the sleeves. Note that in the 0.90 pct C water hardening steel stresses are compressive both at the inner and outer surfaces, and tensional at the neutral axis. The maximum compressive stresses tangential to the sleeve are about 50,000 psi, and the maximum tensional stresses are about 90,000 psi. There was a definite case and core pattern in this water-quenched sleeve which accounts to a large extent for the compressive stresses on the inner and outer surfaces.

In the oil-hardened sleeve the stresses are much less, and are actually reversed. Here, stresses are tensional at a tangent to the sleeve at both the inner and outer faces, showing a maximum of 8000 psi at the outer diameter. At the neutral axis these stresses are just under 5000 psi and are compressive.

In the air-hardened sleeve made from air hardening steel, the stresses are considerably less, and only a fraction of the water or oil hardening stresses. In this case the tangential stresses are tensional at the inner surface of the sleeve, having a maximum of about 5000 psi. These stresses reduce to zero approaching the neutral axis and remain substantially zero to the outer surface, where they are slightly compressive.

Next, a set of sleeves was made from the three steels, quenched from their appropriate hardening temperatures, and then drawn at 400°F for 1 hr. The internal stresses were again determined as before.

Fig. 5 shows the internal stresses in these hardened and drawn sleeves. Note that stresses in the water hardening steel are now just about equal to the oil-hardened sleeve in the as-hardened condition. On the other hand, the sleeve made from the oil hardening steel in the drawn condition shows about the same internal stress as the as-hardened air-hardened sleeve. The sleeve made from the air-hardened and drawn steel shows internal stresses which are practically nil.

Figs. 4 and 5 show that there are less internal stresses in such a regularly shaped object as a hollow cylinder when it is air cooled, as compared to water and oil quenching. The difference between the internal stresses in water-hardening is great as compared to oil or air hardening, and there is less internal stress in air hardening steel compared to oil hardening steels.

This latter difference is slight, but considering the trend in tool making to demand greater accuracy in hardening with greater freedom from cracking in intricate sections, it is considered significant as a possible basic reason for the superiority of air hardening steels and the air cooling process in certain critical applications. It is reasonable to suppose that the differences in internal stress found between the water, oil, and air hardening steels for these simple hollow cylinders are magnified considerably at corners and recessed corners, and by intricate changes in light and heavy sections of the tool.

Distortion During Hardening

One of the most important manifestations of internal stresses is the distortion encountered during hardening of irregularly-shaped tools. In water or oil quenching such tools, variations in quenching speed will be encountered in various sections, with the net result that considerable variation in the amount of internal stresses will be present. This variation will be greater as severity of quench increases.

In water hardening, the internal stresses will be high even in quenching regularly-shaped sections, and if the additional relative size change is added, it is obvious that cracking hazards will be great. Assuming the tool does not crack, the heat-treater is faced with distortion, resulting in increased costs in toolmaking due to considerable finish grinding.

A standard measure of distortion is the navy test ring. This is a flat circular plate of steel with a hole machined offside so that the hole almost touches the outside diameter. A slot is cut through from the outside diameter to the inside hole resulting in a test specimen having a heavy and light section. The movements caused by internal stresses during quenching are magnified, since the small opening, or slot, is greatly affected by movement of the entire outer diameter of the piece.

In general, air hardening steels have a definite advantage in lower dimensional changes on the navy ring test, particularly in changes of the slot width. For example, with an oil hardening non-deforming tool steel tested in this manner, the slot width increased .0135 in., while on the other hand, using an Air-Tough steel, there was a reduction of .0020 in. in width. As pointed out before, movements during quenching are magnified at this point, since the small opening represents the most unbalanced part of the specimen.

These measurements on internal stresses and

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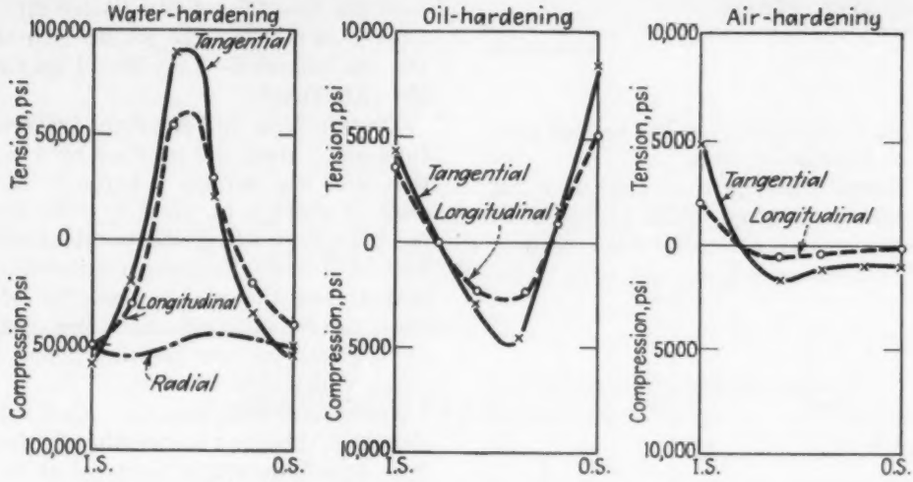

FIG. 4—Comparison of internal stresses formed in hardening water, oil and air-hardening steels. Hardnesses are, respectively, Rc 67 (surface) and 40 (core), Rc 64, and Rc 64 to 65. I.S. refers to the inner surface, O.S. to outer surface.

distortion developed in water, oil, and air hardening steels show that conventional methods of measuring internal stresses in uniform shapes, such as cylinders, do not necessarily reveal the differences in distortion found in these grades of steel. The greater stresses found in water hardening steels can be readily explained on the basis of their duplex case and core structure. Both the oil and air hardening steels hardened throughout the cylinders used to evaluate internal stresses, and the slight difference in internal stresses does not reflect the distortion shown in the navy ring test. It appears that the greater part of distortion is caused by those internal stresses developed where part of the tool, such as the lips on the navy ring test, cools much faster and transforms sooner than the more massive body of the tool. These stresses will be more unbalanced than those found in the cylinders, and will depend almost entirely upon the severity of the quench. Furthermore, considerable plastic flow, or permanent deformation, takes place in water or oil quenching, which may also account for a large part of the distortion found in unbalanced tools. Up to the present time, no satisfactory measure of this plastic flow has been investigated.

Air hardening steels have some advantage as regards size change, not because the absolute size change is less but because a minimum of size change can be obtained over a considerable range of drawing temperatures. However, a given-sized specimen made from one of the conventional oil hardening non-deforming grades of steel can be made to show substantially nil size change if the drawing temperature is correctly chosen. The difficulty lies in that the correct drawing temperature for nil size change will vary with the size of section, which means that intricate sections will show size change in some

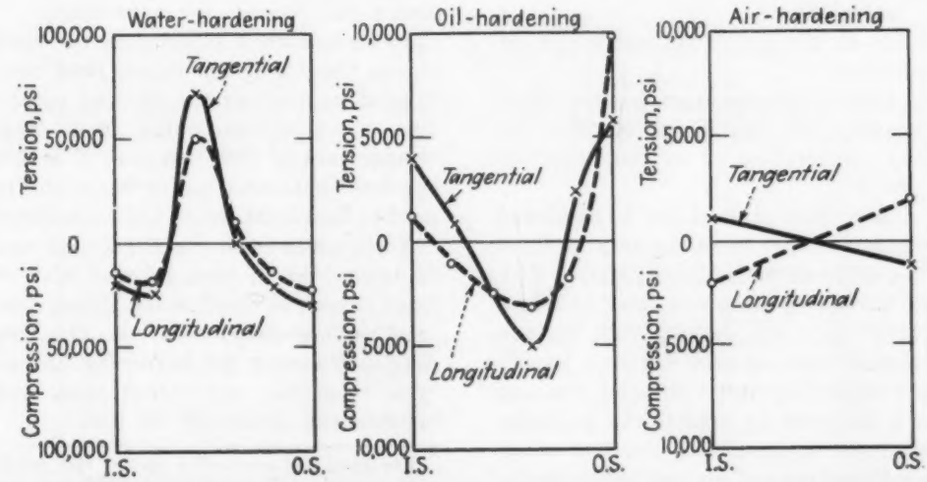

FIG. 5—Comparison of internal stresses formed in hardening and drawing water, oil and air-hardening steels. Samples were drawn at 400° F. Final hardnesses are, respectively, Rc 61 to 62 (surf.) and 40 (core), Rc 60 to 61, and Rc 60.

sections when made from even the best of non-deforming oil hardening steels.

The size change to expect in air hardening tool and die steels will be about 0.0002 to 0.0005 in. per in., consistent over a considerable spread of drawing temperatures and section sizes. This

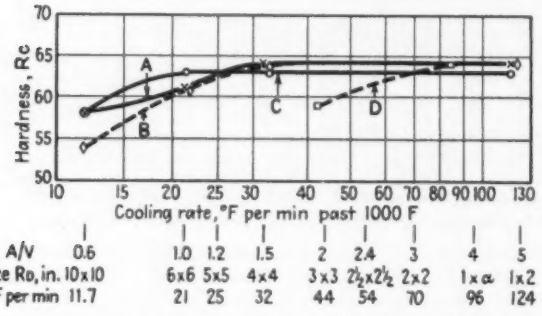

FIG. 6—Air hardenability of the (A) Air-Wear, (B) Air-Hard, and (C) Air-Tough types of air-hardening steels.

minimum size change and low distortion in intricate sections of the air hardening steels is a definite advantage when exceptionally complex tools and dies are considered.

In view of the fact that some range of hardness can be developed in air hardening steels depending upon the size of sections, chemical analysis, and treating temperatures and time at heat, some data will be shown on the air-hardenability of these grades.

The center cooling rate of a regularly-shaped mass of steel depends only upon the surface per unit volume (see fig. 3). Also, the center and surface cooling rates of regularly-shaped pieces of steel are substantially the same through the temperature range of 1000° to 1300°F. If the steel is cooled fast enough through this range, the austenite is retained to room temperature, and only martensite occurs as the transformation product of austenite.

Fig. 3 leads to the following conclusions on air-hardenability:[3]

(1) Heat treating temperature has no effect on rates of cooling past 1300°F, or 1000°F if the heat treating temperature is in the range of 1500° to 1900°F;

(2) the cooling rate of steel can be predicted with reasonable accuracy from the data in fig. 3 if surface per unit volume is known; and

(3) if air hardening steels are rated in terms of the hardness they will develop with various cooling rates past 1000° or 1300°F, then a knowledge of the surface per unit volume of the tool will enable a designer to predict the probable Rockwell hardness obtainable in the tool when made from various types of air hardening steels.

Fig. 6 shows air-hardenability of the three matched air hardening steels; (A) the 1.5 pct C —12 pct Cr—1.5 pct Mo (Air-Wear), (B) the 1 pct C—5 pct Cr—1.25 pct Mo (Air-Hard), and (C) the 0.70 pct C—2 pct Mu—1 pct Cr—1.25 pct Mo (Air-Tough).

The Air-Wear and Air-Hard types will harden fully up to about a 4 in. diam by 4 in. long section, and will develop a hardness of Rc 60 in sizes of about 6 in. diam by 6 in. long. These two grades are susceptible to retention of a large amount of austenite at room temperature if overheated, and the air-hardenability of the two steels can be quite different from that shown in fig. 6 unless the heat treating temperatures are closely followed.

Air-hardenability of the Air-Tough grades show that this steel is exceptionally deep hardening. It will develop a hardness of Rc 62 to 63 when air-hardened in sizes up to 6 in. round by 6 in. long, and a hardness of Rc 60 in sizes of 8 to 10 in. round by 10 in. long. Unlike the Air-Wear and Air-Hard types, the Air-Tough grade is not susceptible to the retention of much austenite on hardening from temperatures in the range 1500° to 1650°F.

For comparison only, air-hardenability of a 1 pct C—2 pct Mn—1 pct Cr—1.25 pct Mo grade of steel is shown on the hardenability chart (fig. 6D). This illustrates effect of carbon content on the air-hardenability of the manganese-chromium-molybdenum steels. These data show that the 1 pct C grades will harden fully only in sizes up to about 2 in. round by 2 in. long, and the hardness drops rapidly for larger sizes.

The high treating temperatures (1700° to 1900°F) needed for the Air-Wear and Air-Hard types require that they be pack-hardened, or heat treated from an efficient controlled atmosphere furnace or neutral salt bath. In a large plant this presents no problem because such heat treating rooms are generally equipped to handle heat treatments in this range of temperatures. To the small heat treating shop, however, treating procedures at these high temperatures present a real problem for large tools.

In such cases, it is sometimes advantageous to choose the Air-Tough rather than the Air-Hard type of analysis as the starting point for selection of an air hardening steel. The treating temperature of 1500° to 1575°F is adaptable to the same heat treating furnaces and procedures used to heat treat water and oil hardening steels.

Tools made from the Air-Tough analysis can be treated in an open furnace with about 2 to 3 pct oxygen in the furnace atmosphere to minimize surface decarburization. The type of scale developed during the hardening and air cooling cycle is of the exfoliating type, and can be brushed and stoned off the tool.

The third and concluding part of this article will deal with typical applications of air-hardening steels in tool and die problems, and will appear in the next issue.—Ed.

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Welding of Thermoplastics

SUMMARY: The fabrication of plastic parts through use of the welding torch opens up a new field in fabricating techniques. The process, the equipment, the technique, the applications and the advantages are covered in this description of thermoplastic welding.

By J. A. NEUMANN

Director of Research,
American Agile Corp., Cleveland

THE development of a successful method for welding thermoplastics permits the fabrication of complicated shapes from standard sheets and sections. This method allows the inexpensive manufacture of parts, especially when only a few are to be made, since the welding technique can circumvent the expensive extrusion and molding processes normally required.

Various welding processes are available: Hot gas welding, heated tool welding, high frequency welding, friction welding, and flame welding. The most flexible and the latest developed is the hot gas welding process. In hot gas welding, irregular shapes can be welded with the same ease as straight seams, and thin sections can be joined to comparatively heavy sections. The technique closely resembles gas welding of metals, and welders familiar with that technique will find no difficulty in learning this new method. The layout and design of plastic weldments from the sheet are similar to metal layout and design, with plastic having the weight advantage.

As in metal welding, the process utilizes heat to melt simultaneously a filler rod and

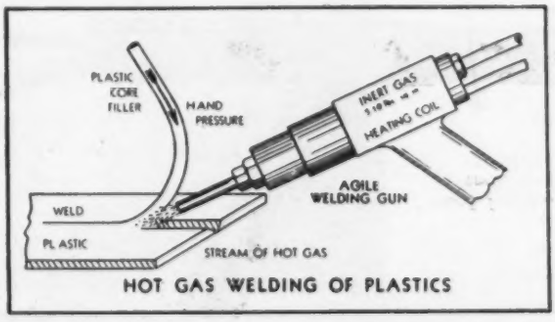

FIG. 1—Hot gas welding technique showing the relative positions of plastic welding rod and hot gas welding gun for effective results.

the two edges to be joined, as shown in fig. 1. The material of the filler rod interfuses with both parts. A joint is obtained that closely approaches the strength of the parent material. A hot jet of gas, preferably an inert gas such as nitrogen or carbon dioxide, best answers the purpose. The welding gas passes through an outside spiral heated either by an oxy-coal-gas or an acetylene-air flame. Another type of torch uses electrical resistance for heating. In either case, the welding gas emerges at the tip of the torch at a temperature between 500° and 600°F. As in the gas welding of metals, filler rods of the same composition as the material to be welded are used. The same type of butt and fillet welds with single or multiple passes are used as in joining metals by welding.

The equipment consists of a heating torch and filler rods. The gas heated torch shows an advantage over the electrically heated torch in that it offers greater flexibility and dispenses with long leads. Electrically heated torches, however, tend to be lighter and have their place when an open flame is not permitted. Such torches are shown in fig. 2.

The welding gas is supplied under a pressure of approximately 5 to 15 psi; and the rate of flow depends largely on the type and thickness of the material. Various size tips are available for the torch and can be interchanged. Temperatures of the welding gas vary with the type of material being welded. Generally 375° to 425°F is required at the surface of the weld. The gas should be approximately 200°F hotter at the welding tip to allow for heat losses because of the gap between the tip and the material

The filler rod material is usually identical to the parent material. This insures uniformity in performance and provides for corresponding softening ranges. While a 10 pct addition of plasticizer to the filler rod tends to improve the weldability and to yield better mechanical properties than unplasticized filler rod, cases have been known where the plasticized material was attacked by solvents and liquids. The size of the filler rod has been shown to have a bearing on the properties of the weld. Larger rods improve the mechanical properties, but fillers exceeding ¼ in. diam should not be used since they create impediments to uniform heating and ready control.

The filler rod is held at an angle of approximately 90° to the work and is hand-fed into the joint under slight pressure, while the burner is held at approximately 45°. The gap between tip of burner and workpiece varies from 1/16 to ¼ in. A slight weaving motion of the burner prevents undercutting. In welding some plastics, particularly Polythene and Saran, it is preferable to hold the rod at an angle of 45° to the horizontal. The leftward or rightward welding technique may be used depending upon the particular type of plastic and upon individual preference.

Whether the type of joint is a butt, lap or fillet weld has little effect on the properties of the weld provided care is taken during welding and the correct technique is used.

A good weld should show no discontinuities. It is evident that the utmost care must be taken for single V-butt welds without sealing runs occurring at the back. For materials up to 16 gage in thickness, no preparation to the plastic sheets or sections is required. Materials thicker

FIG. 2—Shown here are two types of electrically heated hot gas welding guns.

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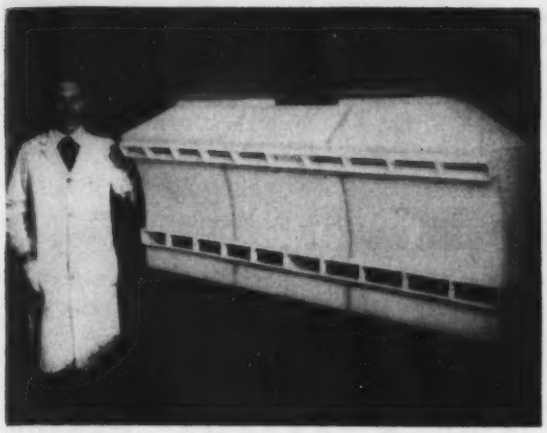

FIG. 3—This exhaust hood of complicated design was fabricated from 1/4 and 3/8 in. Polythene plastic sheet, cut to shape and hot gas welded.

than this should be beveled at the edges, the beveling angle varying from 55° to 80°, similar to the arc welding preparation.

Joints made by hot gas welding do not attain their full strength immediately after welding. A few hours should elapse before they are subjected to any stress. Welded butt joints reach up to 100 pct of the strength of the parent material, while fillet welds are considerably weaker owing to insufficient penetration.

The speed of welding varies between 3 and 10 ipm, according to the type and thickness of plastic being welded. Any attempt to increase the speed beyond these limits will usually result in overheating, burning, or improper fusion.

Since there is a close resemblance between the welding of metals and the welding of plastics, welders familiar with the former technique will encounter little difficulty in acquiring this new skill. The somewhat less extreme conditions, virtual absence of fumes, unobstructed visibility and lower temperatures make for a ready proficiency in the welding of plastics after a reasonable practice period.

The welding of plastics finds application wherever particular conditions make the use of extruded or molded plastics unsuited or uneconomical. This is enhanced by the fact that plastic welds have the same chemical resistance as the parent material. Successful uses have been found in the chemical industries for fume ducts such as shown in figs. 3 and 4, buckets, piping, jugs and vats, for handling hydrofluoric acid, sulfuric acid, nitric acid, strong alkali and brine solutions. Another application consists of tank-linings.

FIG. 5—Utilizing the electrical qualities of Polythene, these high frequency, 20-in. diam, insulators are made from 3/4 in. sheet, formed in half sections and welded.

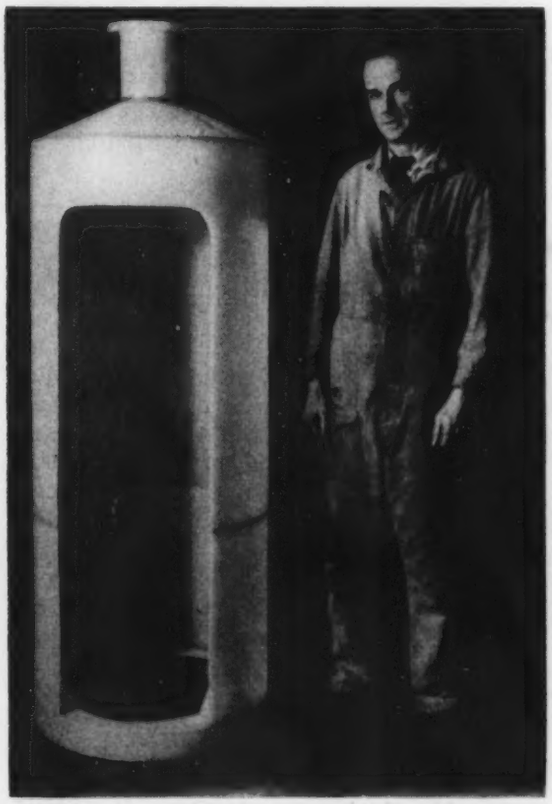

FIG. 4—The fume hood shown here was also cut from 1/4 and 3/8 in. Polythene sheet stock and welded into final shape.

The welding of piping met with particular success in the lining of fermentation vats, yeast buckets, funnels and dripping pans in the brewing industry. In water softening and purifying equipment, and in laundries where chlorine containing bleaching lyes are pumped through plastic piping, the welding of joints has proved entirely satisfactory, combining strength with a speedy and inexpensive fabrication process.

In the electrical field, Polythene insulators recently have started to replace those made of porcelain. Typical of such insulators is shown in fig. 5. The dielectric losses, the electric breakdown strength, and the light weight of Polythene should cause more extensive use of these formed and welded insulators.

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Champion Rivet Eliminates 90% of Manual Lifting Jobs

By C. P. DIEMER

Works Manager,
Champion Rivet Co.,
Cleveland

SUMMARY: An effective modern materials handling system putting ram trucks, fork trucks, hand lift trucks, scales, and hoists to their most efficient use in Champion Rivet Co., has resulted in the elimination of 90 pct of the manual lifting operations formerly encountered. Advantages reported include savings in time, space and man-hours.

BY developing its materials handling techniques over the years and by the ingenious handling of specific products, the Champion Rivet Co., Cleveland, has eliminated 90 pct of the manual lifting operations from its production process. Its mechanized handling system utilizes ram trucks, fork trucks, hand lift trucks, scales and hoists.

Advantages of this handling system include savings in time, space and man-hours as well as the fact that incoming raw materials and materials-in-process are handled in large unit loads. Formerly men would unload incoming shipments by hand, but larger unit loans and the fact that labor today does not perform such heavy tasks, has helped to bring about the use of heavy duty materials handling equipment.

Since Champion uses large quantities of wire in making rivets and welding rods, it has the problem of handling coils of wire. Coils are delivered to the plant by truck and railroad cars, as shown in fig. 1. Ram trucks drive onto the street truck body and pick up coils of wire. From 8 to 10 coils are picked up in this manner and transported directly to storage where they are tiered two or more layers deep. The ram truck also takes coils to processing machinery and takes large diam wire into the pickling and liming room.

An adaptation of a Yale high lift platform truck to serve as a self-dumping ram truck is shown in fig. 2. The platform of the truck was narrowed to approximately 1 ft wide, and a section of I-beam was pivoted to the end of the platform so that about half of its length extended over the edge of the platform. The truck-end of the I-beam is fitted with a notch that enables the beam, or ram, to be held horizontally when carrying a load. When the load

is discharged, the notched end is released and the weight of the load automactically pivots the ram, or beam, downward, spilling the load as the truck backs away. A round section has been secured to the top of the ram to prevent abrasion of the coils.

Hoists permit loads to be lifted mechanically above floor mounted equipment. This saves the aisle space that would be required if vehicles were used. The use of hoists is particularly advantageous when loads must be maneuvered many times.

To handle coils after pickling and liming a 1-ton trolley-mounted crane hoist takes the wire into and out of temporary storage and to swaging operations prior to going to the die processing machines. The pickup is a simple hook-type element, as shown in fig. 3. Raising and lowering of the hoist is electrically controlled. By pushing the load parallel to the I-beam on which the hoist is mounted, it can be moved the length of the bridge crane I-beam. By pushing it perpendicular to the I-beam, the bridge crane I-beam itself moves along the length of the plant. Thus, the hoist covers the entire plant. The push-button hoist control is suspended from a linkage, preventing any strain on the electrical cable or cable terminals.

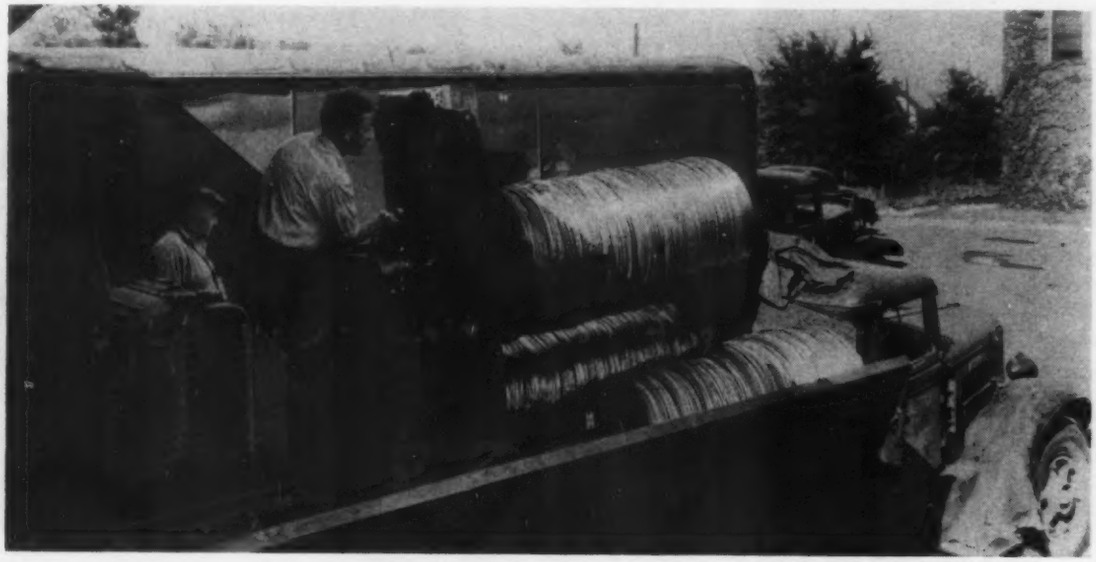

FIG. 1—Ram trucks drive onto the body of street trucks and pick up 8 to 10 coils for delivery directly to storage.

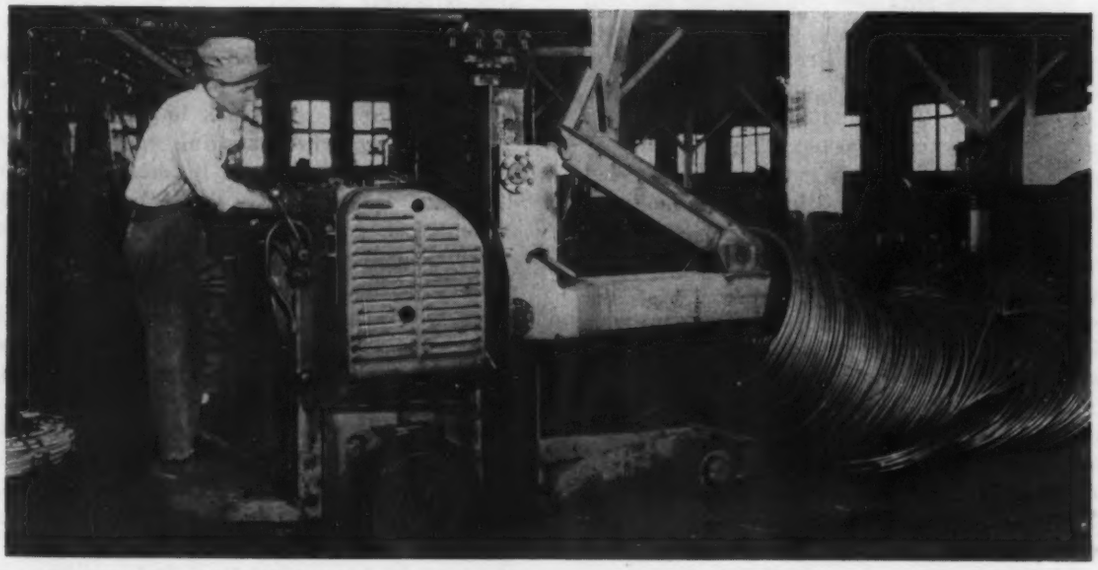

FIG. 2—Adapted from a high lift platform truck, this self-dumping ram truck releases the load of coils when the notched end is released.

FIG. 3—A simple hook-type element suspended from a hoist moves coils to any point in the plant on four-directional overhead rail system.

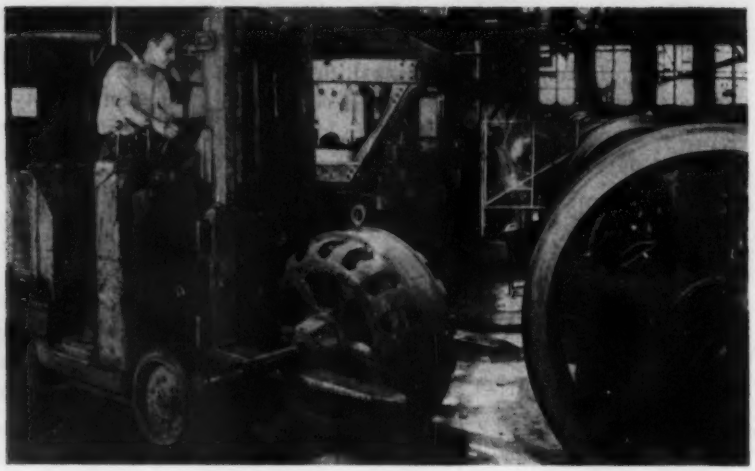

FIG. 4—A fork truck is used for maintenance moving of a heavy dismantled motor to repair shop.

FIG. 5—A roller-platform dial-scale expedites keg loading of rivets from a supply chute.

Another hoist application is in the heat treating room where pins used for coupling railroad cars are hardened. These pins, made in lots of 10,000, are first heat treated and then removed from the ovens to quenching tanks by a ½-ton hoist. The pins are scooped into a specially constructed basket. The two sides of the basket are made of metal strips spaced 2 in. apart. This feature allows the quenching oil to quickly reach all pins in the basket. An unusual dumping feature provides for quick removal of the load after quenching. The hinged handles that hold the basket horizontally during quenching swing upward after the operation, tipping basket to unload.

Fork trucks are used for unloading boxes of incoming electrode rods, for performing maintenance operations, and for handling finished products. Fig. 4 shows a fork truck performing a maintenance operation that would require special handling such as rigging and scaffolding if this truck was not available. It is handling a mismantled motor for repairs.

Trucks of this type have cut work hours by approximately 25 pct in the shipping operations of this plant where hand trucks formerly were used. Now finished products are placed in kegs or cartons and palletized, or put on skids, for rapid fork truck handling.

Another material handling tool integrated with the flow of material in this plant is the dial scale. In fig. 5 newly made rivets are being put into kegs for shipment. The operator scoops rivets into kegs until the required weight is reached. Since a section of the roller conveyor is mounted on the scale platform, the loaded keg is then rolled onto the main conveyor for subsequent heading and shipping. No lifting is necessary, the operator merely gives the keg a shove and gravity does the rest. A store of empty kegs is brought to the operator so that he need only reach around, place one on the scale, and continue the filling operation. The large dial of the scale permits accurate and easy reading and requires no manipulation of beams or poises.

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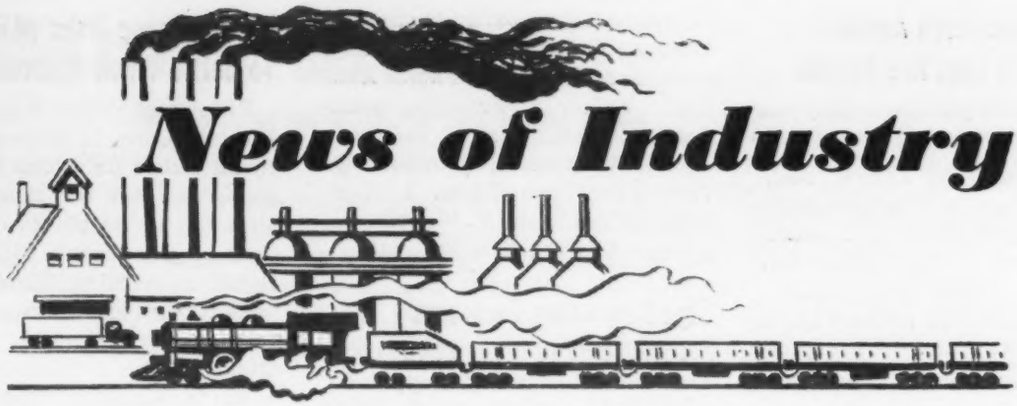

Q-L Ore

Readers of THE IRON AGE will recall that the interested American companies were listed several months ago (see THE IRON AGE, Sept. 1, pp. 97-98) and that the problems and progress of the huge development have been followed for more than a year. For more details see THE IRON AGE, Nov. 4, 1948, p. 155; and Oct. 27, 1949, p. 81.

As Usual, Weirton Betters USWA Pattern on Insurance

Weirton, W. Va.—Weirton Steel Co. and the Weirton Independent Union, Inc., have agreed upon a new joint-contributory insurance program calling for improved benefits at lower unit cost, to 13,000 hourly-paid and salaried employees here and at Steubenville, O.

Scheduled to become effective Jan. 1, 1950, the plan replaces a program in effect since 1926. Weirton will pay 60 pct of the cost, employees 40 pct.

The company and the union are now negotiating changes in the present contributory retirement program — in effect since 1941 — which provides minimum benefits of $100 a month, including Social Security.

For an employee earning an average of $300 per mo, who is married and has one or more children,

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American Steel Firms Sign for Q-L Ore

Will join with Canadian company in development of huge project to mine and ship some 10 million tons of Quebec-Labrador iron ore annually . . . U. S. firm will finance it.

Cleveland—Five American steel companies have taken an option to participate in development of Quebec-Labrador iron ore. Jules R. Timmins, who has been heading up the venture, announced this week that Republic, Armco, National, Wheeling and Youngstown Sheet & Tube would join with Canadian interests in the project in which his companies and Hanna Coal & Ore Corp. have been interested.

Mr. Timmins, president of Labrador Mining & Exploration Co., and of Hollinger North Shore Exploration Co., said that a new Canadian company, Hollinger-Hanna, Ltd., will manage the operation, and an American company — in which the steel companies will participate with the Canadian firms—will finance it. The American company will be the Iron Ore Co. of Canada.

Lots of Work Ahead

The latter company has been given the right to lease a large part of the iron ore reserves in the concessions, but the Canadian companies are retaining ample reserves to supply the steel needs of Canada, as well as to anticipate exportation of ore to England and other European countries in the future.

Mr. Timmins said a great deal of additional exploratory development and engineering work is yet to be done, and while it is proceeding as rapidly as possible, it will be at least another year or two before any start can be made on construction.

"The plan contemplates," said Mr. Timmins, "the construction of 360 miles of railroad from the mines to Seven Islands on the St. Lawrence River, terminal and port facilities at Seven Islands, the development of the mining properties, electrical power development, and building the communities required for the eventual production and transportation of 10 million tons of iron ore a year.

While no accurate estimates of the cost of the project are available, the size of the undertaking is estimated at $150 to $200 million.

Howard Heads Munitions Board

Washington—Hubert E. Howard, coal and banking executive, has been named Chairman of the Munitions Board by President Truman. The post had been vacant since the resignation of Donald F. Carpenter last summer.

Railroad Executives Agree More Freight Cars Are Needed

AAR president protests against idea of government subsidy.

Chicago—At the annual meeting of the Assn. of American Railroads here recently, rail executives indicated they would buy more new freight cars, particularly box cars, but no real quota for new construction was adopted.

This action was taken when shippers at the annual meeting of the National Industrial Traffic League complained about "too much talk and too little action" about freight car supplies. Members of this organization account for about 80 pct of the total freight tonnage hauled on the nation's roads.

W. T. Faricy, president of AAR, told a news conference that the railroads' executives are aware that car retirements are running at about 5500 a month, about half of which are box cars. He acknowledged that new installations were negligible and that everyone agreed that new cars should be purchased and old ones repaired within financial limitations of each and every road.

Attacks Mail Rates

When asked to comment on the suggestion by Interstate Commerce Commissioner Alldredge, that the government might have to consider subsidizing the railroads. Mr. Faricy protested vigorously against any proposal for subsidies to the railroads. He said, however, that if the public won't take action to wipe out subsidies to truckers, airlines and water carriers, the railroads eventually may have to ask for some kind of subsidy in self-defense.

Mr. Faricy turned the situation around by charging that actually the railroads were "subsidizing the government," in the form of low mail pay. He said the railroads were carrying 94 pct of all intercity first class mail at less pay than the air lines were getting for handling the other 6 pct.

Four new directors were elected to the AAR's board during the session. They are: C. E. Denny, president of Northern Pacific Railroad; Walter S. Franklin, president of Pennsylvania Railroad; L. F. Whittemore, president of New York, New Haven & Hartford Railroad; and C. W. Johnson, president of the Erie Railroad.

Sign New Labor Contracts

Pittsburgh — The Spang-Chalfant Div. of National Supply Co. and the A. M. Byers Co. have signed Bethlehem-type pension-insurance agreements with the CIO United Steelworkers of America, ending strikes at these companies.

Spang-Chalfant employs 3600 men at Etna and Ambridge, Pa., and A. M. Byers 2100 men in Pittsburgh and Ambridge.

Republic Declares $1.25 Extra

Cleveland—Directors of Republic Steel Corp. declared in place of the usual extra dividend of 25¢ a special year-end dividend on the common stock of $1.25 per share, payable Dec. 22, 1949, to stockholders of record Dec. 5, 1949.

Westinghouse Asks NLRB To Settle Union Representation

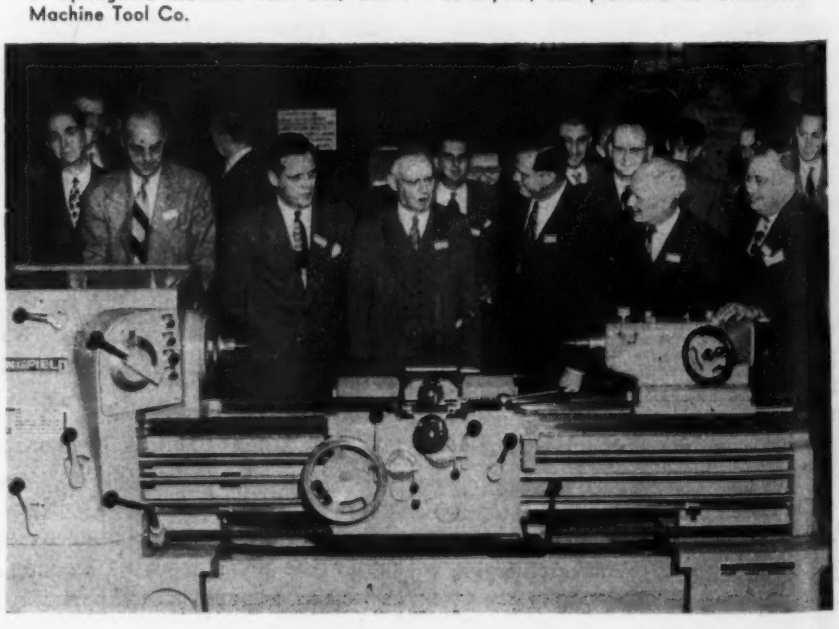
Pittsburgh—The Westinghouse Electric Corp. is hoping the National Labor Relations Board can straighten out the tangled labor situation at its plants due to action by the recent CIO international convention disowning the old CIO United Electrical Workers union and setting up a new electrical union.

W. O. Lippman, vice-president in charge of Westinghouse labor relations, has asked the board to look into the matter of which union the company should deal with, since there are now conflicting claims over the right of employee representation.

If the board finds such question exists, it can call for an election to settle the question once and for all.

Westinghouse is being strictly impartial in the matter. In a letter to employees, Mr. Lippman explained the situation, and the company's position that it has no legal right to judge which union it should bargain with until after the NLRB makes up its mind.

ANNIVERSARY CELEBRATION: In conjunction with the celebration of the 25th anniversary of the American Machine Tool Distributors' Assn. was a tour of the plant of Springfield Machine Tool Co. Shown here inspecting the new Springfield 16-in. Model "S" lathe are a group of visitors. Immediately behind the lathe, from left to right, are R. L. Giebel, president of Giebel, Inc., New York; F. M. Montanus, Paul A. Montanus, and R. C. Montanus, secretary, president and vice-president, respectively, of Springfield Machine Tool Co.; and A. G. Bryant, vice-president of Cleereman Machine Tool Co.



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Steelmaking Rate Snaps Back Fast

Industry is way ahead of 1946 post-strike performance because of lessons learned then, better coal, more cold metal and balmier weather.—*By D. I. BROWN*

Chicago—A much faster return to high steelmaking rates has been chalked up in the past few weeks than was registered after the 4-week 1946 steel strike. Chicago mills are 4 to 6 days ahead of their 1946 performance despite a 6-week shutdown. Other districts have done even better. Operators here credit their startling 1949 comeback to four major factors: Better weather, adequate cold metal supplies, benefit of experiences of 1946 which permitted better planning and much better quality coal.

A check with the weather bureau recalled that the strike and start-up weeks of February 1946, were cold. Temperatures in Cleveland, Pittsburgh and Chicago ran from a low of zero to a high of 39° with averages well under freezing. This year was balmy with lows of 36° to a high of 75° and no freezing days encountered at all. Mild weather meant that hydraulic and water cooling lines didn't have to be drained. When the men came back they didn't have to keep torch crews busy thawing out water lines—they concentrated on making iron and steel instead of rooting around trying to find some coke jacks to keep themselves and the water lines warm.

Iron Shortage Hurt in 1946

In 1946 there was a shortage of cold iron which precluded starting openhearths on cold charges. This time the openhearths were charged as soon as the furnaces could be brought to temperature and steel heats were being tapped before the blast furnaces were making usable iron. Bessemer converters were able to start sooner too—a big help in duplexing shops. As the blast furnaces came through with good iron, normal sulfur and silicon contents, the cold charge in the openhearths were put back to the regular 50 pct. During the first 3 days of the resumption of operations, no Chicago openhearth plant had more than 12 pct hot metal available. In 1946 the steel shops had to wait days for usable hot iron. This time they went ahead with cold iron until the blast furnaces came through. And they came through with good iron in record time.

Plant personnel pointed out that the 1946 strike came after 7 years of full operation. In other words, at that time the mills had not shut down for so long that they hardly remembered how to start up. The lessons of 1946 paid off and the precise planning which took place all during the strike permitted many mills to better their most optimistic predictions.

Union Maintenance Helped

Union maintenance in some plants was a help. In 1946 the mills were not able to make many such agreements. In one plant here the union masonry crews came in a week early and repaired

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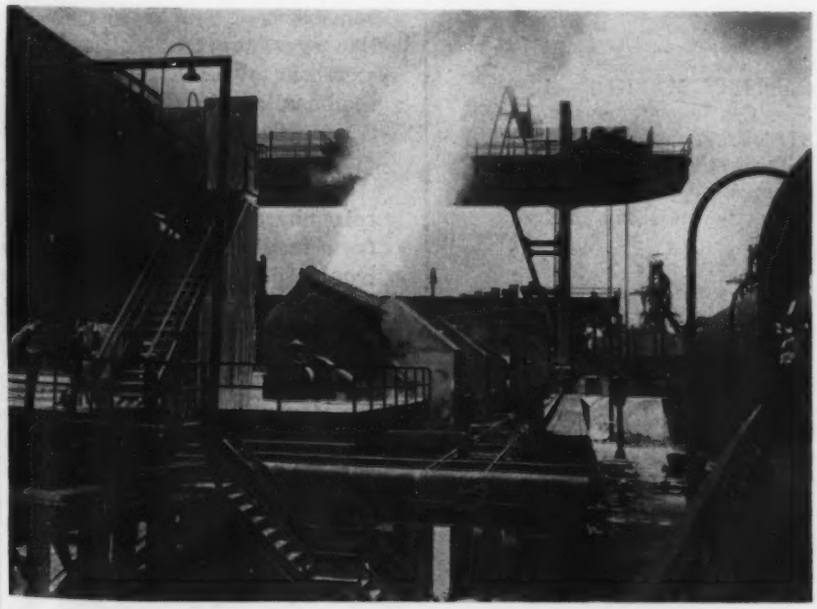
THAR SHE BLOWS: The sparks fly as this new bessemer converter goes into action at the Lorain, Ohio, works of National Tube Co., a U. S. Steel Corp. subsidiary. The converter is one of four recently installed in a major modernization and improvement program at the plant. The new all welded converters were made by Pennsylvania Engineering Corp.



Maytag Sets Production Record

Newton, Iowa—The Maytag Co. set a new world production record for the washing machine industry when the 6 millionth Maytag washer rolled off its production line recently.

The Maytag Management Club staged an open house in honor of the occasion and an estimated 10,000 visitors toured the factory. They inspected educational and historical displays, including exhibits of farm machinery, Mason-Maytag automobiles and other company products.

Portsmouth Steel Deal Approved

Detroit — Detroit Steel Corp. stockholders voted this week to buy the physical assets of Portsmouth Steel Corp. Detroit Steel will issue about 300,000 shares of stock to Portsmouth and pay an estimated $6 million for Portsmouth's inventories and physical assets.

INDUSTRIAL SHORTS

PIPE MILL—The General Services Administration, Washington, has announced the sale to CONSOLIDATED WESTERN STEEL CORP., Los Angeles, of certain surplus government facilities at Orange, Tex. Consolidated will establish a new pipe mill there and the output will be approximately 50 miles of large diameter pipe a month.

SCHOOL FOR BOSSES — A unique management school has been set up at plants of the WESTINGHOUSE ELECTRIC CORP., it was announced recently. The school is enrolling supervisors, from foremen to managers, to study the latest principles of successful management at their various plants.

AMF BUYS—DeWalt, Inc., Lancaster, Pa., manufacturer of radial saws, has been purchased by the AMERICAN MACHINE & FOUNDRY CO., New York. AMF will continue operation of the DeWalt plant with the present personnel through a wholly-owned subsidiary.

OPENS NEW PLANT—The expansion of its sales, manufacturing and engineering facilities in Canada has been announced by BURNDY CANADA, LTD., with the opening of a new factory at 381 Greenwood Ave., Toronto. They will manufacture electrical specialties.

FOUNDRY AGENT — Whiting Corp., Harvey, Ill., has announced the appointment of CARL F. MILLER & CO., INC., with offices at Seattle and Spokane, as agents for their varied line of foundry equipment.

CHANGES NAME — The Morrow Mfg. Co., Wellston, Ohio, has announced that its name has been changed to the McNALLY PITTSBURGH MFG. CORP. There will be no change in management personnel or operating policies.

ACS AWARD—H. V. Churchill, chief of the analytical chemistry division of the Aluminum Co. of America's research laboratories, New Kensington, Pa., has been selected to receive the 1949 Pittsburgh award by the Pittsburgh section of the AMERICAN CHEMICAL SOCIETY.

REYNOLDS REP — Reynolds Metals Co., Inc., Richmond, has appointed the SOUTHERN STATES IRON ROOFING CO., Savannah, as a distributor of their aluminum mill products and architectural shapes.

NEW LABORATORY — A new laboratory complete with modern equipment for research and testing in the metal finishing field has been added by the CHEMICAL CORP., Springfield, Mass. The company manufactures Lusteron zinc bright dip and other metal finishing specialty products.

ADDS VALVE LINE — Industrial valves which are the products of the recently acquired Belfield Valve Div., of MINNEAPOLIS-HONEYWELL REGULATOR CO., Minneapolis, will be sold through 74 Honeywell branch offices in the United States, Canada and Europe.

EASTERN MARKET — E. W. Bliss Co., Detroit, has appointed STEDFAST & ROULSTON, INC., Boston, as its sales representative for its complete line of mechanical and hydraulic presses.

MOVES — Announcement has been made that S. P. KINNEY ENGINEERS, INC., has moved their offices from Pittsburgh to Carnegie, Pa., where they have equipped a plant to manufacture the blast furnace equipment which they sell.

Steelmaking Snaps Back

Continued from Page 111

openhearth roofs, piped temporary gas heating lines to blast furnace stoves, built runaround runners from the monkeys or slag notches on the blast furnace casting floor and in general got the plant ready for quick resumption of iron and steel making.

Also a factor was practice in going down during the many strike threats of summer and early fall which allowed the mills to smooth out all the bugs of such operations. The shutdown was conducted with a military exactness that included the charging of all soaking pits to capacity with ingots. In starting up, this steel was heated the moment the coke ovens and blast furnaces came through with gas (after 2 to 3 days) and rolling operations got under way fast.

Coal Is Better This Year

Coal quality, hence coke quality, was better this time. Two plants reported their 1949 coal contained 2 pct less ash than did the 1946 coal and this permitted the blast furnace operators to tap good iron much sooner as good coke precluded burned out tuyeres, etc. Blast furnaces were banked with much better coke than in 1946 and the coke ovens had been charged with stock coal and operated for the first few days in the 1949 comeback on that charge. Coal is like eggs, the fresher the better, and coke ovens here switched to road coal as quickly as they could. Also, this year good scrap was available in sufficient quantities.

The lessons of 1946 were well remembered. Typical is a blast furnace plant which in 1946 had trouble disposing of the offgrade iron of the first few days' production. They recalled the difficulty of getting cold, mushy, offgrade first heats out of the modern bottletop ladles. The ladles must be returned quickly or the furnaces have to go on slack wind. This time they dug up all their old fashioned, opentop ladles and had them in position for use.

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U. S. Steel Mission Making Industrial Study in Pakistan

New York—A group of 19 U. S. Steel Export Co. specialists are now in Pakistan where they will spend 2 months surveying the kinds and quantities of steel needed by the new country. Lauri Shaffi, Consul General of Pakistan, told the press here last week that the mission was the result of a suggestion made by Ghulam Mohammad, Finance Minister of the Southeast Asian nation, to George W. Wolf, president of U. S. Steel Export Co. E. E. Robins, the export company's regional director for the Far East, heads the mission, which will be guests of the government during the survey.

There are no plans to build an integrated mill in Pakistan, because it has no ore and poor coal and will use only about 100,000 tons of finished steel this year. The government, which so far has had two balanced budgets and a favorable balance of trade, wants to encourage steel fabrication and possibly add to the few small rolling mills now in operation there. It has been importing steel from India and recently signed up for 100,000 tons from Belgium.

Mr. Shaffi said that while a geological survey was only just getting under way it was believed that Pakistan had large deposits of high grade chrome ore. Its economy now revolves primarily around export of jute, food and other agricultural products. The mission which arrived in Karachi Nov. 1 will make a general industrial survey of the country. It is believed to be the first such group to visit Asia under auspices of a private company since President Truman announced his Point 4 Program.

Links, Canada, Mexico, U.S.

Brownsville, Tex.—At the celebration marking the completion of the first complete inland waterway link between Mexico and the United States and Canada, held here on Nov. 21, Chester C. Thompson, president of American Waterways Operators, said that the link now gives a channel through the heart of America for all "shallow draft" vessels. The three-day celebration was attended by thousands of citizens from all over the greater Southwest.

Metals Included in Marshall Aid

Washington—New procurement authorizations recently, including $11 million in metals and industrial equipment, brought the Marshall Plan cumulative total to nearly $7.4 billion.

Authorizations from United States sources included: Steel mill materials and products, Belgium and Luxembourg, $1.5 million; engines, turbines, generators, and other industrial machinery, France, $2.5 million; coal, Italy, $1.6 million; zinc, alloys and zinc products, Britain, $4.8 million; and steel mill products, Sweden, $700,000.

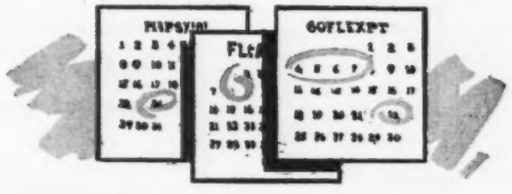
Destination Controlled Export Items Increased

Washington—For practical purposes, the only existing restrictions on exports are the licensing requirements on certain commodities necessary for controlling destinations for reasons of security or foreign policy.

This is emphasized in a quarterly report to the White House and Congress by Commerce Secretary Sawyer. Most items requiring licenses because of shortages have been lifted from the positive list but the number of destination controlled items have been increased somewhat.

These commodities, previously controlled only for European destinations, now require a license for export to all countries except Canada.

The report also points out that except for destination control, the tinplate industry is now free from governmental control over marketing of its products for the first time since early 1942.



Dates to Remember

Nov. 27-Dec. 2		**American Society of Mechanical Engineers**, annual meeting, New York.
Nov. 28-Dec. 3		**Exposition of Chemical Industries**, New York.
Nov. 30-Dec. 2		**Society for Experimental Stress Analysis**, annual meeting, New York.
Dec.	4-7	**American Institute of Chemical Engineers**, national meeting, Pittsburgh.
Dec.	7-9	**National Assn. of Manufacturers**, 54th Congress of American Industry, New York.
Dec.	8-9	**American Institute of Mining Engineers**, annual conference, Pittsburgh.
Dec.	8-10	**American Institute of Mining & Metallurgical Engineers**, Electric Furnace Steel Committee, annual conference, Pittsburgh.
1950		
Jan.	9-13	**Society of Automotive Engineers**, annual meeting, Detroit.
Jan.	14	**American Electroplaters Society**, annual meeting, Chicago.
Jan.	15-19	**Associated Equipment Distributors**, annual meeting, Chicago.
Jan.	16-18	**Truck-Trailer Manufacturers Assn.**, annual convention, Edgewater Park, Miss.
Jan.	20	**Malleable Founders' Society**, semiannual meeting, Cleveland.
Jan.	22-24	**Institute of Scrap Iron & Steel, Inc.**, annual convention, Washington.
Jan.	23-27	**American Society of Heating & Ventilating Engineers**, annual meeting, Dallas.

October Construction Activity Sets 10-Year Record

Washington—Despite beginning of the seasonal downturn, October construction was highest on record since 1939 at $1.8 billion, bringing the January - October total to $16 billion.

A decline of 6 pct over last year in private construction was more than offset by a 25 pct rise in public expenditures, largely in schools and hospitals.

Cumulative totals by type include: Industrial, $839 million, off $300 million; commercial, $831 million, off $200 million; residential, $5.5 billion, off $400 million; public utilities, $2.8 billion, up $100 million; and highways (public), $1.4 billion, up $100 million.

Will Receive '49 Pittsburgh Award

Pittsburgh—In recognition of distinguished service to chemistry in Pittsburgh, H. V. Churchill, chief of the analytical chemistry division of Alcoa Research Laboratories, New Kensington, Pa., has been selected to receive the 1949 Pittsburgh Award by the Pittsburgh section of the American Chemical Society. The presentation will be made Dec. 14.

Mr. Churchill has been with Alcoa 30 years, during which time he has made many contributions to progress of the aluminum industry. His study and research of the standardization of analytical chemical methods and applications of the spectograph to aluminum problems was particularly outstanding.

Expect Record Manganese Imports

Washington—The United Kingdom imported 305,000 long tons of manganese ore in the first 8 months of this year. If this rate continues, the entire year's imports will exceed the 397,000 tons imported last year and will almost double the average of 1937 and 1938, reports the Dept. of Commerce.

POURING: The first pouring of silver and cobalt - containing speiss at the new smelter of Cobalt Chemical & Refinery Co., Ltd., Cobalt, Ont. Concentrates are melted in an electric arc furnace under vacuum, which permits drawing off the arsenide fumes. A button of pure silver collects in the bottom of the ladle buggy and is easily separated from the speiss.

New Firm Will Boost Canadian Cobalt Output

Strategic importance of this metal has grown with development of gas turbine and jet engines . . . Africa now produces most of world supply—*By JOHN ANTHONY*

Cobalt, Ont.—Canadian production of increasingly strategic cobalt will be sharply increased when a new smelter and cobalt refinery, now being brought to completion, get into full production.

Africa Is Chief Supplier

The strategic importance of cobalt has grown very rapidly with the development of gas turbine and jet engines. In these applications the metal is used as an important part of alloys requiring dimensional stability and resistance to heat effects at very high temperatures. The need for cobalt by the U. S. and other countries will grow significantly as more and more military and civilian planes are powered by such engines.

At present, the principal supply of the metal comes from Africa. The Belgian Congo produced about 3500 metric tons in 1947, according to the U. S. Bureau of Mines, out of an estimated world production of 5100 tons. Total U. S. consumption in 1948 was 2520 short tons. Northern Rhodesia and French Morocco were the next largest producers in 1947, with very much smaller outputs. Canada produced only 217 metric tons. The U. S. is a relatively small producer, in 1945, the last reported year, producing only 550 short tons. Estimated U. S. reserves in 1943 were only 62,500 tons.

The new and modern smelter now being brought to completion is in an historic area of rich silver and cobalt bearing ores located nearly 300 miles north of Toronto. These are complex ores, containing arsenides that are impossible

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to remove without very critical refining methods.

The smelter is being completed by Cobalt Chemical & Refinery Co., a newly organized company associated with Silanco Mining & Refinery Co. which began construction some years ago. Silanco holds the major stock interest in the new company, and also holds 32 ore bearing properties in the vicinity.

Freight Is a Big Factor

This rich mining area produced well over 300 billion oz of silver from its ores by 1922. Since that time there has been a marked reduction in silver output from the Cobalt district because of the lack of a smelter within reasonable shipping distance. The old smelter that once served the area burned down many years ago.

In the meantime, high freight costs and the general apathy of smelters to the special problems of miners producing these complex ores made it uneconomical to ship anything but the highest grade of silver concentrates. There was very little recovery of cobalt during this period.

The new smelter and refinery of Cobalt Chemical have been designed to recover silver, cobalt and arsenicals from the local ores, together with such byproducts as nickel and copper. The average composition of the Cobalt district ores is as follows:

Silver	10 to 10,000 oz per ton		
Cobalt	10.92 pct	Antimony	1.43 pct
Arsenic	26.22	Sulfur	16.63
Nickel	5.01	Alumina	4.74
Iron	10.34	Silica	17.84
Lead	3.06	Lime	1.59
Copper	1.22		

As a general rule when silver content runs high cobalt is low, and vice versa.

Will Make Chemicals

The production of the company will be largely confined to chemical products derived from these metals. A list of its products would include silver and silver compounds; cobalt oxide, sulfate and chloride, and cobalt driers and colors; nickel oxide and salts; arsenic metal, arsenates and

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Urge Cautious Approach on Air Pollution

Still much to learn, say scientists at annual meet of Industrial Hygiene Foundation . . . Industry is spending huge sums . . . Some big savings are reported.

Pittsburgh — Increased public awareness of air pollution is all the more reason for a cautious approach to the problem, according to speakers at the 14th annual meeting of the Industrial Hygiene Foundation, here.

Scientists concerned with the problem were frank to admit that there is still much to learn about the subject, both from the standpoint of effects on humans, animals and plant life, and the proper measures of control.

Basic Information Lacking

"Unfortunately, our knowledge of the physiological action of mixed gases is meager," says Dr. H. H. Schrenk, Foundation research director, "and the influence of aerosols on the physiological effects of gases is almost unexplored.

"In attempting to evaluate the effect of smogs the difficulty lies not in obtaining data but in the lack of basic information on which to base valid interpretations. Fundamental studies are essential to develop a foundation on which to build sound atmospheric pollution control programs."

A tendency, even by physicians, to attribute some ailments to air pollution was deplored by Dr. Raymond Hussey, of Detroit.

"It is unfortunate to tell the public that sinusitis and chronic irritation of the throat results from this exposure until we have data that represents a firm foundation for the establishment of such a fact," he said.

Industry often finds itself in the middle in the air pollution controversy and sooner or later must face up to that fact, according to G. Edward Pendray, public relations counselor. He added, however, that industry as a whole has not been dragging its feet in meeting its responsibilities in this respect, and cited these figures to prove it:

"I had them moved to her desk. Most of the calls are for her anyway."

Industry Spends Big Sums

In response to a survey questionnaire, 50 companies reported they have spent in excess of $35 million in the last 2 years on air and water pollution elimination and plan further expenditures of at least $32.5 million in the next 2 years. On the basis of this, industry as a whole may now be spending $200 to $300 million a year for these purposes.

Jones & Laughlin Steel Corp. has spent $220,000 in the last two years, and plans to spend $1.5 million in the next 2 years. Standard Oil Co. (New Jersey) and associated companies have spent $5 million in the last 2 years and will spend another $5 million in 1950 and 1951; Dow Chemical Co. $3

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Discusses Air Pollution

Continued from Page 115

million since 1948; the Ford Motor Co. $1.5 in 2 years.

Cost of air pollution control equipment is astounding, Mr. Pendray said. He pointed out that an electric precipitator installation on an old smokestack to cure a fly-ash problem may cost $75,000 to $200,000 For a small company, this is a considerable investment, he said.

"We need a basis for understanding just what air pollution is, how to measure it, and how to interpret the measurements," said W. C. L. Hemeon, Foundation engineering director.

Some cost savings that have accrued to industry through recovery of materials formerly dispelled into the atmosphere as waste were cited by Dr. George R. Hill, of American Smelting and Refining Co.:

Huge Savings Cited

One smelter recovers more than $1 million a year in gold, silver and copper out of gases from 12 multiple hearth roasters. One mint recovers more than $100,000 annually in gold and silver from gases ventilating its refining furnaces. One lead smelter recovers more than $300,000 a year in lead and silver out of gases from 10 sintering machines. One cement factory more than 100,000 tons a year of cement-making material out of gases from four rotary kilns. At other plants large quantities of zinc, nickel, silenium, tellurium, cadmium, arsenic, antimony, bismuth and other metals.

Daugherty Defends Fact-Finding

Chicago—In a talk before the Chicago Club, Professor Carroll R. Daugherty, Northwestern University, head of President Truman's fact finding board in the steel strike, declared that the country would benefit if such fact finders had more power to make recommendations.

He emphasized the importance of public opinion in a labor dispute and said such boards act as "eyes and ears of public opinion," but unless they make recommendations the benefits of their investigation and experience are lost. Professor Daugherty also said that the provisions of the Taft-Hartley Law for settling labor disputes keep the public from being fully informed.

Canadian Cobalt

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acids; and oxides of copper, lead and antimony.

The smelter will handle concentrates at an average rate of 15 tons a day. Concentrates from the Silanco properties are expected to average three tons a day. The smelter will also handle concentrates from other local mine producers which are expected to total six tons a day, once mining operations are begun again. There are an estimated 4 million tons of tailings above ground, the residue of previous silver mining operations. While it is believed that the cobalt may have been leached out of the tailings, they are expected to be processed to recover metallic contents.

Uses Foreign Concentrates

Another cobalt smelter in Ontario is located about 250 miles away from Cobalt at Deloro. Operated by Deloro Smelting & Refining Co., Ltd., this smelter is also capable of refining the complex arsenical cobalt ores of Canada. It is understood that this smelter is largely concerned with the concentrates from Britain.

The largest application for cobalt in the United States is at present for permanent magnet alloys, largely used in the electronics field. In 1948, this use consumed 593 short tons, according to the Bureau of Mines. The cast cobalt-chromium-tungsten alloys used for turbines and other high temperature applications consumed 413 tons. Salts and driers consumed 409 tons, and ground coat frit for porcelain enamels, 307 tons.

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Gross National Product Declines; October Business Up

Washington—The rate of the gross national product, combined national goods and services, declined $3 billion to $256 billion for the third quarter 1949, according to the Commerce Dept. The average rate for the year remained at $259 billion.

More than half the quarter's decrease was accounted for by a drop in personal income. But personal expenditures for consumption remained stable at the $178.5 billion level despite unsettled labor disputes.

Aside from the steel and coal strikes, business in general showed improvement in October to start off the last quarter. Non-agricultural personal income rose to the $193 billion rate in September—equal to the 1948 last quarter peak level.

Air Force Awards Contracts

Washington—Tumpane Co. of Marietta, Ga., has been awarded a $758,000 contract for protection, maintenance, recording and storage of machine tools for the Air Force.

Other AF contracts included $162,000 to the Norton Co. of Worcester for machine grinding and maintenance data, $134,000 to Minneapolis Honeywell Regulator Co. for overhauling of tools and test equipment, and $125,000 to Republic Aviation Corp. for development of special tooling.

Orders 91 Diesel-Electric Units

Philadelphia—The Baldwin Locomotive Works has received an order from The Pennsylvania R. R. for a total of 91 diesel-electric locomotive units including: Twenty-four 750-hp switchers; 41 1000-hp switchers; four 1000-hp road switchers; three 2000-hp switchers, each comprised of two 1000-hp units equipped for multiple operation; and 16 1500-hp road freight units. The aggregate value of this order is approximately $9½ million.

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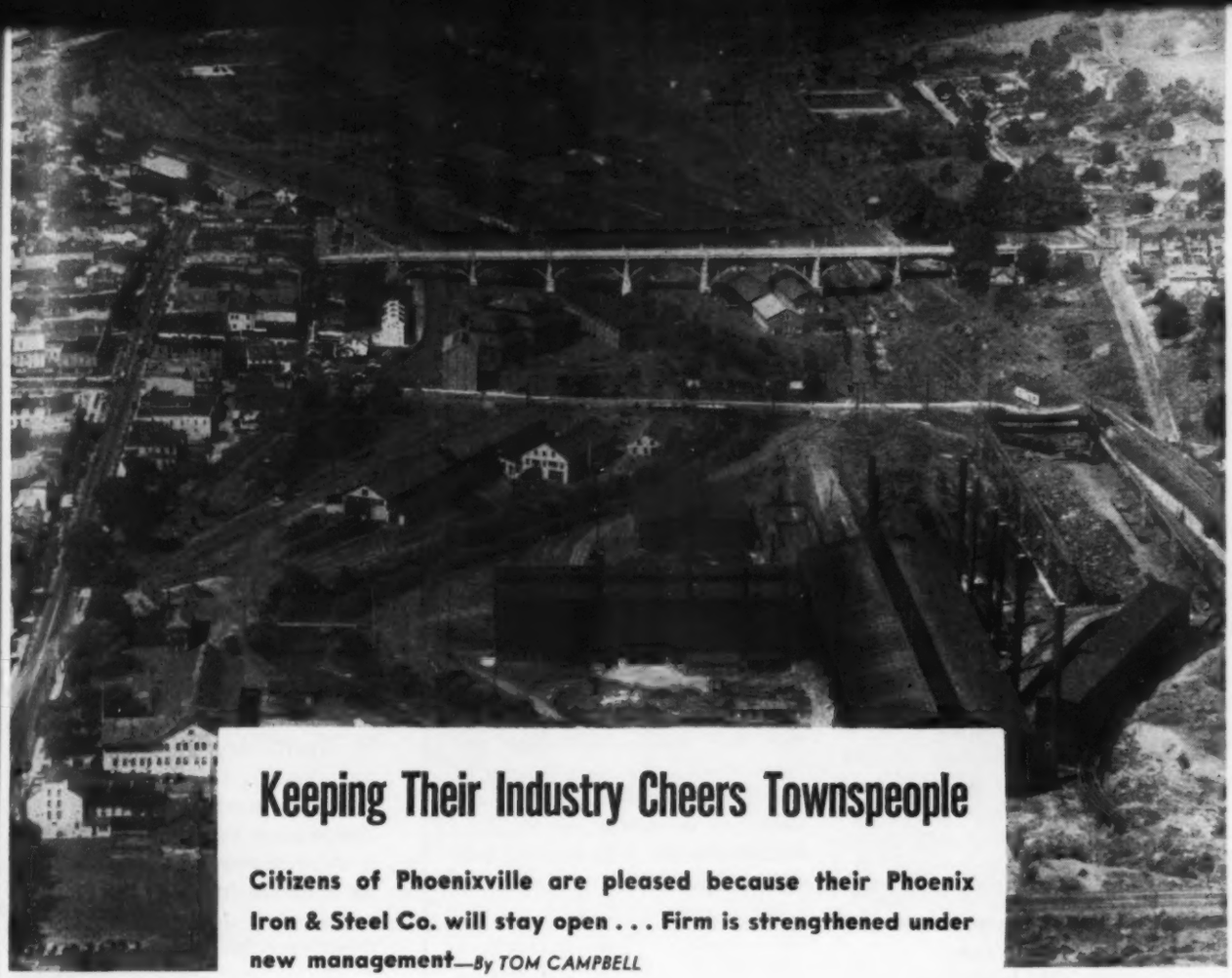


Keeping Their Industry Cheers Townspeople

Citizens of Phoenixville are pleased because their Phoenix Iron & Steel Co. will stay open . . . Firm is strengthened under new management—*By TOM CAMPBELL*

Phoenixville, Pa. — People in this small town are breathing easier these days. Like folks in all towns with a majority industry which was having a hard time of it they were afraid their steel mill might close its doors permanently. That fear has now been eliminated.

The Phoenix Iron & Steel Co.—called the Phoenix Iron Co. before recent acquisitions — has been bought by Barium Steel Corp. for its long-term possibilities. The plant is now a subsidiary of Central Iron & Steel Co., another Barium enterprise. The Phoenix Bridge Co. becomes a subsidiary of Phoenix Iron & Steel. All of which sounds good to local merchants and workers.

A General Housecleaning

For weeks on end Barium people, headed by J. A. Sisto, board chairman, and Rudolph Eberstadt, president, have been getting the steel plant into shape. Accumulations of years—almost hundreds of years in some cases—have been moved to the dump pile.

The watchwords are cleanliness and safety — all pointed toward quality of product. The new management has a fetish on good housekeeping. They are having their own way on this.

Background

Phoenixville, Pa. — Phoenix Iron Co. started operations about 1783. The first product was charcoal pig iron. By 1790 the firm was making iron nails.

The Reeves family acquired control of the works in 1827. This family continued in the Phoenix company for 118 years. That name is venerable in the steel industry. It was instrumental in the progress made in cast, rolled and wrought iron making in this country.

Beams, channels, tees and angles were made by Phoenix as early as 1855. This opened up a market for bridges, structural building and railroad needs.

In 1944 Samuel J. Reeves died and the company passed out of the hands of the family.

Machinery has been overhauled in this plant, parts of which date back to 1783. The blooming mill has been taken apart piece by piece and is being reassembled, repaired and replaced where needed.

Working conditions for the men will be brought up to the best possible level. Antiquated lockers, pulpits and other remnants of the old days are gone. They will not be back.

A New Spirit at Phoenix

There is a new spirit at Phoenix. The slogan of the new owners is "Not opportunists but opportunity." With a first rate steel plant, blooming mill, structural mill and one of the finest smaller bridge and structural shops in the East, Phoenix hopes to be a little power in the eastern market.

This goal will probably be helped considerably by the f.o.b. mill system of pricing steel. The high freight rates, which continue to make midwestern mills cautious

Viewing the News from

The ECONOMIC SIDE

By JOSEPH STAGG LAWRENCE

"Psychological Distance"

NEW YORK is nearer to Singapore today than it was to Philadelphia 100 years ago. Modern transportation has made this world more compact. Distance has ceased to be the barrier that it was only yesterday. These are common observations.

Careless reasoning and bad perception have concluded that the distance which separates the various parts of the globe in other fields has likewise been foreshortened. It is difficult for the thinkers of this school to appreciate the tough barriers which language, custom, history, and local interest still constitute. These are walls, dividing the world into distinct compartments, hardly less formidable today than they were a century ago.

It is for this reason that well-meaning men are frequently shocked to find that a program which seems eminently sensible to Americans is rejected by men of other nationalities.

Precisely such a shock has just been received by our ECA officials in Western Europe. A part of the unwritten compact between this country and the beneficiaries of the Marshall Plan called for the progressive elimination of trade impediments and the restoration of free competition within the area of Western Europe. To this end, governments were urged to speed up the removal of price controls, export and import quotas, allocations, and other devices that hampered the free flow of trade. The advantages of this need not be explained to any American.

Yet it now develops that as the various countries of Europe relaxed their controls, private business leadership stepped in with cartel organizations which produced an end result exactly the same as that of government control. Furthermore, it seemed that the cartels took over with the full knowledge and encouragement of government. Prices are now fixed, territories allocated, newcomers barred, production and distribution fully "rationalized."

One of the effects which is causing dismay to our ECA officials is the protection which these devices give to existing plant and equipment. They retard the introduction of new machinery and the construction of new plant. Our men know that unless full advantage is taken of all the improvements in production that modern technology provides, Western Europe will never be able to turn out the volume of goods necessary to sustain that standard of living to which its socialist politicians aspire.

All this is in sharp contrast to the attitude of American businessmen toward retooling and rebuilding of plants. Here the pressure is entirely in the other direction. Avid search is under way for new techniques and new machines which will tend to offset the higher level of labor costs and maintain a progressive price appeal to the consumer.

In fact, at the recent meeting of the National Machine Tool Builders Assn. a new approach to obsolescence was suggested by L. W. Scott Alter, president of the American Tool Works Co. He proposed that tools be subject to annual bids by a secondhand machinery dealer and that such bids be used as the book value at which the equipment is carried.

This would provide a realistic basis for depreciation and constitute a powerful stimulant to replacement in ample time. It is in direct contrast to the continental attitude that machines be used as long as they are capable of performing the functions for which they were originally designed. Here is a difference measured not in miles but in psychology which modern means of communication have not yet bridged.

Phoenixville Happy

Continued from Page 117

on their selling activities in the East, will help Phoenix.

Aggressive Selling Noted

When the Reeves family left the management of Phoenix in 1944 with the death of Samuel J. Reeves, the firm passed to the Floyd Odlum group. Later it was bought for its raw steel capacity by the Phoenix Apollo people. Still later Kaiser-Frazer took over the plant for steel when it could not get enough elsewhere. Then the plant shut down and people in this town were worried.

Emphasis will be on the bridge works, with Central Iron & Steel at Harrisburg furnishing plates and Phoenix the necessary shapes and structurals. The sales staff of the bridge company has become even more aggressive and hopes to be a factor in all types of structural work over and above its experience in bridge building.

The parent company hopes also to be a factor in the structural shape market in the East with emphasis on aggressive sales and quality. On these plans depends the future of the Phoenix steel plant and its bridge works.

On the basis of the thorough rehabilitation that has gone on in the furnace and finishing departments, things look good. With the help of Central Iron & Steel management, led by Basil Graham, president, and Bill Zerbe, vice-president, it looks as if the townspeople in Phoenixville now have something to really work for.

Vacuum Cleaner Sales Increase

Cleveland—The Vacuum Cleaner Manufacturers Assn. has reported that in October factory sales of standard size household vacuum cleaners were second highest of any month in 1949. The October total was 272,520 cleaners which when compared to September shows an increase of 8.9 pct. Vacuum cleaner sales for the first 10 months of this year are still 16.2 pct below the 2,827,842 sold in the same period in 1948.

UNIVERSITY OF MICHIGAN LIBRARIES

Construction Boom Seen Continuing in 1950

Forecast by Commerce Dept. places dollar volume near $19 billion . . . Close to 14 million tons of steel will be needed . . . Housing and highways get high rating.

Washington—Close to 14 million tons of steel will be required in 1950 to take care of the needs of construction. This estimate is based on the preliminary 1950 building forecast by the Commerce Dept.

While there will be considerable shifting in types of construction next year, a preliminary forecast by the Department places the expected dollar volume at about $19 billion. This would equal the indicated 1949 figure and exceed figures for 1948.

This also means something of an increase in the actual physical volume of construction since prices of building materials are not expected to rise and some may be less than in the current year.

Housing Requirements High

About $2 billion worth of construction is expected to go into the nation's highways. This would require about 1 million tons of steel. The figure may be higher in view of the growing emphasis on elimination of grade crossings and replacement of inadequate bridges.

New residential construction next year is forecast at $6.5 billion which would produce from 875,000 to 900,000 dwelling units. About 830,000 units are expected to be built by private enterprise while about 60,000 to 80,000 are expected to be built through the public housing program.

Industrial Expansion Slows

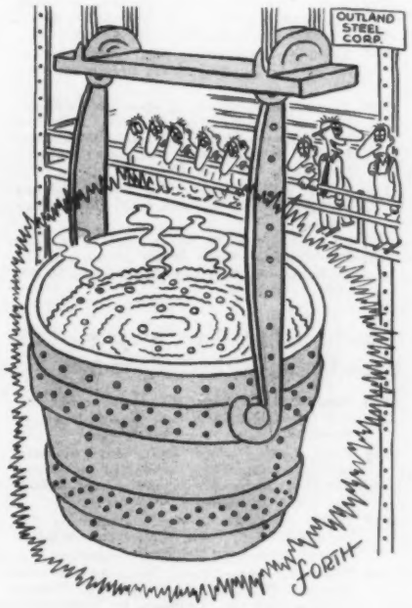
The housing outlook alone indicates requirements for 1.8 million tons of steel. This includes about 800,000 tons of heating equipment, gas, water, and other ducts and conduits. Other major steel requirements would be 300,000 tons for structural shapes, 260,000 tons of nails, and 45,000 tons of builders hardware. (No maintenance requirements are figured in the foregoing.)

Commerce expects the construction of new factory and other industrial plant facilities to continue the decline started a year ago. A 26 pct drop is forecast, from an expected $975 million this year to $725 million in 1950.

Construction of commercial buildings such as stores, garages, offices, warehouses and so on is expected to remain at the present level of about $1 billion or a little better.

Military construction is expected to drop $20 million to $100 million but this will be more than offset by $150 million rise in conservation and development work which will then be around $900 million. This includes river, harbor and reclamation projects.

Municipalities are expected to expand sewer and water facilities by at least $100 million in 1950. Expenditures for hospitals, schools and other public institutional building is expected to increase by at least $175 million.



"Oh, then it was my wife who fell in—I was afraid it was one of the workmen."

Most privately owned public utilities except gas companies are expected to do less construction work next year. Railroads will cut back by an estimated 9 pct, telephone and telegraph by 13 pct, and light and power construction will drop about 6 pct. Federal power work will expand 10 pct.

Gas Companies to Expand

Gas companies, faced with a tremendous backlog of pipe shortages, will expand activities by from 5 to 10 pct—from $800 million during 1949 to $850 million or more. On the other hand, construction of oil pipelines is seen as remaining at the present $160 million a year rate.

The Department expects that except for large size pipe and some probably spot steel shortages early in the year, there will be adequate supplies of building materials in 1950.

New York State Building Permits Rise Above '48 Totals

New York—During the first 9 months of this year, permits for building construction valued at $619 million were issued by New York State urban communities, according to Acting Industrial Commissioner Thomas F. Moore, Jr. Residential building accounted for $396 million, nonresidential building for $168 million; additions, alterations and repairs for $55 million.

Dollar volume was up $209 million over the corresponding period in 1948, due in part to an increase of $125 million in public housing construction in New York City. Private residential building in the city increased by $25 million, and residential building (public and private) in urban communities in the remainder of the state showed an increase of $16 million. Additions, alterations and repairs to all types of buildings declined by $2 million.

New nonresidential building construction showed a net in-

crease of $45 million over last year with the United Nations headquarters, valued at $23 million accounting for more than half the gain. Commercial and industrial buildings were up by $11 million with $9 million of this amount allocated to office buildings. An increase of $17 million in education buildings was offset by a decline of the same amount in the money expended for institutions. Churches and allied structures were $8 million ahead of last year's totals.

Weirton Pension Plan

Continued from Page 109

the insurance program provides: Life insurance of $3,500, plus $500 funeral benefit; sickness and accident benefits of $35 a week for 26 weeks; hospitalization of $7.50 a day, plus $75 incidental expenses; surgical benefits of $175 for the employee, his wife and each child. Gross cost to the employee will be $5.40 a month, but net cost will be 15 to 20 pct lower, depending on actuarial experience. Under the existing plan the benefits are much smaller and the employee pays $6.15 a month.

Two features not found in other steel company plans include payment in equal monthly installments over 5 years, the full amount of life insurance to employees totally disabled before age 60, and the right of the employee to continue the full amount of his insurance after retirement at the low group premium rate, or reduction of the insurance to $1,250, entire cost to be borne by the company.

Resume Your Reading on Page 109

National Steel Pays Extra

Pittsburgh — National Steel Corp. has declared a year-end extra of 50¢ in addition to the usual quarterly dividend of $1.25 on the common stock, both payable Dec. 15. This brings total disbursements this year to $5.50. Last year when the stock was on a $1.00 quarterly basis, a year-end extra of $1.00 together with 10 pct in stock were paid in December.

Construction Steel Awards

Fabricated steel awards this week included the following:

2600 Tons, Hudson, Wis., bridge over St. Croix River reported last week as an inquiry, Allied Structural Steel Co., Chicago, is now reported low bidder.

1300 Tons, Booth Pt., Fla., Florida Power & Light Corp., power plant, to O'Neal Steel Works Co., Birmingham.

1230 Tons, Allentown, Pa., steel water transmission pipe line, City of Allentown, to Bethlehem Steel Co., Bethlehem.

750 Tons, Menasha, Wis., Racine St. bridge through C. R. Meyer & Sons, Oshkosh, Wis., to American Bridge Co., Pittsburgh.

550 Tons, Freehold, N. J., rug plant for Karagheusian, Inc., through Turner Construction Co., Philadelphia, to Bethlehem Contracting Co., Bethlehem.

500 Tons, Harrisburg, Pa., addition to Polyclinic Hospital, to Standard Equipment Co., Harrisburg, Pa.

300 Tons, Sunbury, Pa., coal conveyor supports for Pennsylvania Power & Light Co., to Bethlehem Steel Co., Bethlehem.

250 Tons, Frederick, Md., Maryland State Roads Commission, bridge, to F. J. Pecora Construction Co., Baltimore.

Fabricated steel inquiries this week included the following:

2160 Tons, Cook County, Ill., highway bridge section 42F-11, bids close Dec. 2.

1440 Tons, Boston and Somerville, Mass., Sullivan Sq. and vicinity. Fred D. Sabin, Cambridge, district engineer. Completion date June 28, 1952.

695 Tons, Cook County, Ill., state highway bridge section 42VF-12, bids close Dec. 2.

620 Tons, Cook County, Ill., highway bridge section 0404-2HF and 0405-1, bids close Dec. 2.

565 Tons, McNary, Ore., bridge across the navigation lock of McNary Dam, Walla Walla District, Corps of Engineers, Ser. CIVENG-45-164-50-57, bids to Dec. 15.

415 Tons, Cook County, Ill., state highway bridge section 42VF-10, bids close Dec. 2.

350 Tons, Kent Island, Md., Maryland State Roads Commission, Kent Island Narrows bridge, due Dec. 6.

320 Tons Cook County, Ill., state highway bridge section 0304-1-HF, bids close Dec. 2.

290 Tons, Jamestown Borough, Pa., continuous I-beam bridge LR 38005(1), Pennsylvania Dept. of Highways, due Dec. 2.

230 Tons, Cook County, Ill., state highway bridge section 0404-1HF, bids close Dec. 2.

195 Tons, Lowell, Mass., 3 span steel stringer bridge, Lakeview Ave. along North Branch of Merrimac River. Fred D. Sabin, Cambridge, Mass., district engineer; completion date, Nov. 15, 1950.

165 Tons, Will County, Ill., state highway bridge section 9F and 9VF, bids close Dec. 2.

100 Tons, Walla Walla, Wash., bridge at Four Mile Canyon, Walla Walla District, Corps of Engineers, Ser. CIVENG 45-164-50-43, bids to Dec. 6.

Reinforcing bar awards this week included the following:

440 Tons, Bedford Park, Ill., water works system through S. N. Nielsen Co., Chicago, to Bethlehem Steel Co., Bethlehem.

355 Tons, Lake County, Ind., state highway bridge section 3139, Arco Midwest Corp., Chicago, previously reported low bidder has been awarded the contract.

150 Tons, Ames, Iowa, men's dormitory for University of Iowa, to Pittsburgh-Des Moines Steel Co., Des Moines, Iowa.

135 Tons, Ft. Dodge, Iowa, building for Certainteed Products Co., through Turner Construction Co., Chicago, to Pittsburgh-Des Moines Steel Co., Des Moines, Iowa.

100 Tons, Cook County, Ill., Glenview Road grade separation to Dean Steel Co., Chicago.

100 Tons, Cook County, Ill., Willow Road grade separation to J. T. Ryerson and Son, Chicago.

100 Tons, Cook County, Ill., Dundee Road grade separation, to U. S. Steel Supply Co., Chicago.

100 Tons, Chicago, Peoria State bridge through Kenny Construction Co., to U. S. Steel Supply Co., Chicago.

Reinforcing bar inquiries this week included the following:

3100 Tons, Pittsburgh, U. S. Veterans Hospital.

1355 Tons, Boston and Somerville, Mass., reconstruction of Sullivan Sq. and vicinity, Rutherford Ave., Main St., Alford St. and Mystic Ave., Boston and Mystic Ave., Somerville; roads, railroad bridge, viaduct, depressed roadway and pedestrian overpass. Fred D. Sabin, Cambridge, Mass., district engineer. Completion date, June 28, 1952.

900 Tons, Philadelphia, Veteran's Administration hospital, due Dec. 6.

740 Tons, Quincy, Wash., structures for West Canal, Columbia Basin Project, Bureau of Reclamation, Coulee Dam, Wash., Spec. 2844, bids to Dec. 21.

470 Tons, Plainfield, Ind., building for Indiana Public Service Co.

435 Tons, Chicago, auxiliary outlet sewer No. 2, Michael Pontarelli, Inc., Chicago, low bidder.

400 Tons, Philadelphia, Youth Studies Center, City of Philadelphia, due Dec. 14.

400 Tons, Westmoreland County, Pa., Pennsylvania Turnpike.

250 Tons, Gloucester, N. J., sewage treatment plant, to be rebid.

200 Tons, Hudson, Wis., state highway bridge.

200 Tons, Peoria, Ill., building for Central Illinois Gas and Light Co.

130 Tons, Milwaukee, building for Standard Electric Co.

115 Tons, Meadville, Pa., nurses home at Spence Hospital.

105 Tons, Cuyahoga County, Ohio, state highway bridge.

100 Tons, Chicago, field house at Loyola Park, bids close Dec. 8.

160 Tons, Los Angeles County, Calif., bridges on Santa Ana Parkway between Rosecrans Ave. and Orange County line, California Div. of Highways, Los Angeles, bids to Dec. 22.

Steel plate pipe awards this week included the following:

125 Tons, Boston, Quincy and Milton, Mass., cut and cover aqueduct Blue Hills Reservoir M. DeMatteo Construction Co., Quincy, Mass., low bidder.

Buys Two Plants from GSA

New York—The Pittsburgh Mill Steel Co., Inc., has acquired two industrial plants in the Philadelphia-Baltimore area, according to Alice G. Hansen, president. Both plants were purchased from the General Service Administration.

The Baltimore plant is a foundry with a magnesium castings division designed by Anaconda Copper Co. It employs 600 men in production of gray iron castings and soil pipe.

The Crum Lynne plant near Philadelphia has an electric melt division for carbon and alloy steel castings or ingots. When in full production it employs about 200 men.

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Briefs and Bulletins

payoff—Large expenditures for coal washing and preparation facilities which produce better metallurgical coal paid off again when the mills resumed operations after the strike. Blast furnace men attribute much of their fast return to capacity production to superior coke produced from 1949 coal, compared with the inferior quality of 1946 coal used after the previous strike.

steel price boosts—Sharon Steel Corp. now quotes its carbon semifinished steel products at $57 per net ton, up $5.00. At the same time last week it advanced hot-rolled strip 6-in. and narrower to $3.50 per 100 lb base, leaving the over 6 in. product at $3.25 base. Reeves Steel & Mfg. Co. has advanced galvanized sheets from $5.40 to $5.65 per 100 lb base.

aluminum pipeline—Substitution of aluminum alloy for steel in a natural gas pipeline has been approved for the first time, on an experimental basis, by the Federal Power Commission. Alabama-Tennessee Natural Gas Co. last week was given FPC permission to make this substitution in a 9500-ft section of 8-in. lateral line which will serve the Reynolds Alloy Co. at Listerhill, Ala.

comeback—Snapping back from strike-induced doldrums, business in the Pittsburgh district may exceed the levels prevailing before the steel and coal strikes. The University of Pittsburgh Bureau of Business Research reports that its index of activity already has reached 144.3 pct of the 1935-39 average, as compared to the strike-low of 65.7. Prestrike level was 156.1.

takes over—All the patent, manufacturing and sales rights of the Barter-Ritco reversible grinder dog of the Rhode Island Tool Co., Providence, has been acquired by the Ready Tool Co., Bridgeport, Conn. Equipment for the manufacture of this grinder dog will be transferred to the Ready plant.

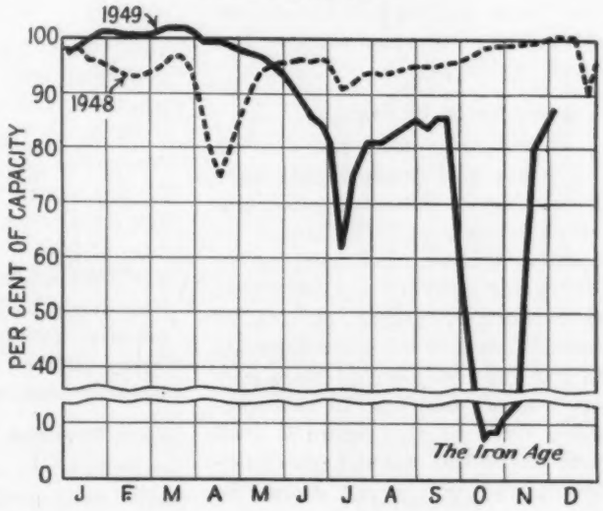
ore prospects—American ore imports may be given a boost if the Spanish government's proposal for a loan is approved by the Export-Import Bank. Spain has suggested that the U. S. grant a loan in return for shipment of chrome, tungsten and iron ores and also mercury.

strike ends—Employes of Superior Steel Co., who walked out 10 days before the nationwide steel strike deadline, are back at work after signing of an agreement between the company and the United Steelworkers. Insurance provisions of the contract follow the Bethlehem pattern, but no pension payments will be made until after next July 31. Meanwhile the company will set aside 10¢ an hr per employee for this purpose, beginning Jan. 1. The agreement was signed Nov. 26.

strategic—Primary aluminum pig metal has been added to the Munitions Board's list of strategic and critical materials to be purchased for the national stockpile. However, no purchases are planned for the current fiscal year, since stockpile requirements of the metal for this period are expected to be met by deliveries from General Services Administration.

fond farewell—Granite City Steel Co. on Nov. 30 closed the last of its old hand mills. In commemoration of the event prominent business and industry leaders attended to bid farewell to the old rolling methods and properly welcome the new. The visitors were given the opportunity of touring Granite City's new modern rolling facilities.

Steel Operations



District Operating Rates—Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
November 20	84.0*	79.5*	74.5	83.0	96.5*	101.0	104.0	49.0	95.0*	59.5	48.0	87.0	97.5	80.0*
November 27	87.0	89.0	80.0	82.0	100.0	101.0	104.0	103.0	95.0	86.0	52.0	84.8	112.5	87.5

* Revised.

Nonferrous METALS OUTLOOK

Market Activities

by John Anthony

Market observers no longer optimistic about prospects . . . Copper buying cuts inventories . . . Strike builds zinc demand but Prime Western available . . . Tin futures at 78¢

NONFERROUS METALS PRICES

	Nov. 23	Nov. 25	Nov. 26	Nov. 28	Nov. 29
Copper, electro, Conn.	18.50	18.50	18.50	18.50	18.50
Copper, Lake, Conn.	18.625	18.625	18.625	18.625	18.625
Tin, Straits, New York	85.00	85.00	85.00	85.00	85.00
Zinc, East St. Louis	9.75	9.75	9.75	9.75	9.75
Lead, St. Louis	11.80	11.80	11.80	11.80	11.80

Note: Quotations are going prices.

New York—Some of the optimism has gone out of the metal markets with the realization that the end of the steel strike would not bring a marked improvement in orders immediately.

The scrap market, harbinger of future developments, has declined in copper and some brass grades for the second week in succession. Aluminum scrap also dropped last week by ½¢ per lb.

Copper Sales Heavy

At the same time the demand for brass mill products has been improving, as indicated by lengthening delivery periods. Copper demand is still very heavy. Sales for November delivery are, with the carryover, in excess of 113,000 tons. With several more days yet to go, it is possible that there may be a small addition to this tonnage. Even so, this figure is 5000 tons above the recent high of October, and will bring down the industry's inventories by another 30,000 to 35,000 tons. The November figure is very close to peak shipment months of 1947 and 1948.

Sales for December are also very heavy. So far they have reached 64,000 tons, indicating a shipment tonnage of at least 100,000 tons. Considering the fact that this is normally an inventory readjustment period, these sales are remarkably high.

Sales of lead for shipment in November are running quite close to the month of October. With a few days to go, they are approaching 28,000 tons. Market factors say that a real cold snap in the East could build this tonnage very rapidly. Imported metal is still being offered to the market at lower prices.

Zinc Demand Spotty

Demand for some zinc grades is still very good. Die casters and the brass mills are picking up practically all the available metal in the higher grades. Prime Western demand is improving with the reopening of the galvanizing plants. But there is no real pressure and plenty of metal is available.

The tightness of some grades of zinc is due to the continuing strike at Palmerton, Pa., and the inability of the Kellogg, Idaho, plant to get into maximum production. Midwestern zinc and lead mines have no incentive to get back into production at present prices. They are not reopening, despite the end of the smelter strike.

Tin Futures at 78¢

Tin brokers have been selling a total of 300 to 400 tons a day, most of which is for February delivery at prices of 78¢ to 78½¢. The steamer Ajax has arrived with about 500 tons shipped on consignment by the British Ministry at prices ranging from 83⅜¢ to 90¢. Brokers say that the real drop is out of the market. The Combined Tin Committee has announced its dissolution, now that the supply of tin is in excess of demand.

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Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 75S-O, 75S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 75S-O, 75S-OAL, 35¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 75S-O, 75S-OAL, 47.6¢.

Plate: ¼ in. and heavier: 2S, 3S, F, 23.8¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 75S-F, 75S-FAL, 33.9¢.

Extruded Solid Shapes: Shape factors 1 to 4, 33.6¢ to 64¢; 11 to 13, 34.6¢ to 76¢; 23 to 25, 36.7¢ to $1.05; 35 to 37, 44¢ to $1.53; 47 to 49, 63.5¢ to $2.20.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 34¢ to 30.5¢; Cold-finished, 0.375 to 3 in., 2S, 3S, 36.5¢ to 32¢.

Screw Machine Stock: Drawn, ⅛ to 11/32 in., 11S-T3, R317-T4, 49¢ to 38¢; cold-finished, ⅜ to 1½ in., 11S-T3, 37.5¢ to 35.5¢; ⅝ to 2 in., R317-T4, 37.5¢ to 34.5¢; rolled, 1 9/16 to 3 in., 11S-T3, 35.5¢ to 32.5¢; 2½ to 3⅝ in., R317-T4, 33.5¢ to 32.5¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.: 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 33.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 75S-T6, 76¢ to 55¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed Base quantity 30,000 lb)

Sheets and Plate: Ma, FSa, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher.

Extruded Round Rod: M, diam in., ¼ to 0.311, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangle: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb per ft, per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.14; 5/16 to ⅜, $1.02; ½ to ⅝, 78¢; 1 to 2 in., 65¢; 0.065 to 0.082, ⅝ to 7/16, 85¢; ⅝ to ¾, 62¢; 1 to 2 in., 57¢; 0.165 to 0.219, ⅝ to ¾, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Base prices, cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and bars	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks	..	40

Copper, Brass, Bronze

(Cents per lb, freight prepaid on 200 lb)

	Sheets	Rods	Extruded Shapes
Copper	32.18	....	31.78
Copper, h-r	....	28.03	....
Copper, drawn	....	29.28	....
Low brass	30.12	29.81	33.03*
Yellow brass	28.69	28.38	31.70*
Red brass	30.60	30.29	33.51*
Naval brass	33.51	27.57	28.82
Leaded brass	....	23.19	27.22
Com'l bronze	31.61	31.30	34.27*
Manganese bronze	37.01	30.92	32.42
Phosphor bronze	50.90	51.15	....
Muntz metal	31.58	27.14	28.39
Everdur, Herculoy, Olympic, etc.	37.19	36.14	....
Nickel silver, 10 pct	39.66	41.87	46.80
Arch. bronze	....	....	27.22

*Seamless tubing.

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	17.00
Aluminum pig	16.00
Antimony, American, Laredo, Tex.	32.00
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be	$24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	$52.00
Bismuth, ton lots	$2.00
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$1.80 to $1.87
Copper, electro, Conn. Valley	18.50
Copper, lake, Conn. Valley	18.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$100 to $110
Lead, St. Louis	11.80
Lead, New York	12.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask f.o.b. New York	$72 to $74
Nickel, electro, f.o.b. New York	42.97
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$69 to $72
Silver, New York, cents per oz.	73.25
Tin, New York	85.00
Zinc, East St. Louis	9.75
Zinc, New York	10.47
Zirconium copper, 10-12 pct Zr, per lb contained Zr	$12.00

Remelted Metals

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	17.25-18.25
No. 120	16.75-17.75
No. 123	16.25-17.25
80-10-10 ingot	
No. 305	22.75
No. 315	19.75
88-10-2 ingot	
No. 210	29.25
No. 215	26.25
No. 245	18.75-21.50
Yellow ingot	
No. 405	14.25-16.00
Manganese bronze	
No. 421	20.75

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	18.75-19.25
0.60 copper, max.	18.25-18.75
Piston alloys (No. 122 type)	16.50-17.00
No. 12 alum. (No. 2 grade)	16.25-16.75
108 alloy	16.75-17.50
195 alloy	17.50-18.00
13 alloy	18.50-19.00
AXS-679	16.75-17.50
5% Ti, Aluminum, f.o.b., Eddystone, Pa.	
Low copper	31.00
2% copper	28.00

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	17.75-18.50
Grade 2—92-95%	16.75-17.50
Grade 3—90-92%	15.75-16.50
Grade 4—85-90%	15.25-15.75

Electroplating Supplies

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	34⅝
Electrodeposited	28⅞
Rolled, oval, straight, delivered	33.84
Ball anodes	32⅞
Brass, 80-20	
Cast, oval, 15 in. or longer	30⅝
Zinc, oval, 99.836, f.o.b. Detroit	17¼
Ball anodes	16¼
Nickel 99 pct plus	
Cast	59.00
Rolled, depolarized	60.00
Cadmium	$2.15
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	79

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	45.00
Copper sulfate, 99.5 crystals, bbl.	11.10
Nickel salts, single or double, 4-100 lb bags, frt allowed	13.00
Nickel chloride, 300 lb bbl	24.50
Silver cyanide, 100 oz lots, per oz.	59
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc sulfate, crystals, 22.5 pct, bags	6.75
Zinc sulfate, 35 pct, flakes, bbl.	7.75

Scrap Metals

Brass Mill Scrap

(Cents per pound; add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	15½	14¾
Yellow brass	12½	11⅝
Red brass	14	13¼
Commercial bronze	14¼	13½
Manganese bronze	12	11¼
Leaded brass rod ends	12¼	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	14.75
No. 2 copper wire	13.75
Light copper	12.75
Refinery brass	13.00*
Radiators	9.25-9.50

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	14.75
No. 2 copper wire	13.75
Light copper	12.75
No. 1 composition	12.50-12.75
No. 1 comp. turnings	12.00-12.25
Rolled brass	10.50
Brass pipe	11.00
Radiators	9.50- 9.75
Heavy yellow brass	9.50
Aluminum	
Mixed old cast	10.00-10.50
Mixed old clips	10.00-10.50
Mixed turnings, dry	8.50- 9.00
Pots and pans	10.00-10.50
Low copper	11.50-12.50

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	13 —13¼
No. 2 heavy copper and wire	12 —12¼
Light copper	11 —11¼
Auto radiators (unsweated)	8¼— 8½
No. 1 composition	11 —11¼
No. 1 composition turnings	10½—10¾
Clean red car boxes	9¼— 9½
Cocks and faucets	9¼— 9½
Mixed heavy yellow brass	7¼— 7½
Old rolled brass	8½— 8¾
Brass pipe	9¼— 9½
New soft brass clippings	10½—11
Brass rod ends	9¾—10
No. 1 brass rod turnings	9½— 9¾

Aluminum

Alum. pistons and struts	4½— 5
Aluminum crankcases	7½— 8
2S aluminum clippings	10½—11
Old sheet and utensils	7½— 8
Borings and turnings	4
Misc. cast aluminum	7½— 8
Dural clips (24S)	7½— 8

Zinc

New zinc clippings	6 — 6½
Old zinc	4 — 4½
Zinc routings	2½— 3
Old die cast scrap	3¼— 3½

Nickel and Monel

Pure nickel clippings	21 —23
Clean nickel turnings	14 —15
Nickel anodes	20 —22
Nickel rod ends	20 —22
New Monel clippings	12 —14
Clean Monel turnings	8 — 9
Old sheet Monel	10 —12
Old Monel castings	9 —10
Inconel clippings	11 —13
Nickel silver clippings, mixed	8 —10
Nickel silver turnings, mixed	6 — 7

Lead

Soft scrap, lead	9 — 9¼
Battery plates (dry)	4¼— 4½

Magnesium

Segregated solids	9 —10
Castings	5½— 6½

Miscellaneous

Block tin	63 —65
No. 1 pewter	38 —40
No. 1 auto babbitt	35 —37
Mixed common babbitt	9 — 9¼
Solder joints	11½—12
Siphon tops	40 —42
Small foundry type	11½—12
Monotype	10½—11
Lino. and stereotype	9¾—10¼
Electrotype	8¼— 8½
New type shell cuttings	11½—11¾
Hand picked type shells	4 — 4½
Lino. and stereo. dross	4¾— 5
Electro. dross	2¾— 3

UNIVERSITY OF MICHIGAN LIBRARIES

MARKETS—PRICES—TRENDS

SCRAP
Iron & Steel

Market Decline Hits Steelmaking Grades

The market reversed its trend this week and most major areas registered losses in the steelmaking grades. The trade has given numerous reasons for the decline, saying that prices went up too fast and that the present drop is only a readjustment. Basically it is very simple; the mills were not pressing for large tonnages and many dealers were reported willing to sell which meant that lower prices would be accepted to consumate a sale. However, the market undertone remains firm and it is expected that if large tonnages were bought the market would firm in a hurry. This week the top quotation of No. 1 steel was up $1.00 in St. Louis. In Cleveland and Youngstown it was off $3.00; in Pittsburgh it was off $2.00; in New York and Cincinnati it was off $1.50; and in Chicago, Detroit and Boston it was off $1.00. THE IRON AGE scrap composite was off $1.00 to $28.92 per gross ton.

PITTSBURGH—The market weakened here this week, with No. 1 heavy melting going for $32.000, a decline of $2.00. After holding out for higher prices since early last month, dealers were reported willing to sell, contributing to the current weakness. Some brokers were inclined to feel that the drop was a temporary readjustment and that prices would strengthen within a short time. Others, however, were of the opinion that the market would be weak for the rest of the year. Most mills were out of the market, and one was holding up shipments due to a strike situation at its Monessen, Pa., plant.

CHICAGO—Prices weakened here for the simple reason that dealers and brokers have a lot of scrap and nowhere to ship it. Opinion as reported last week was pessimistic. Sales at the lower figure were not large and the weakness is considered temporary. As yet the mills have not come in with large new purchases. They are still trying to straighten out the freight car pile up at the mills. It is expected that once they ascertain where they are and what they need the market will firm again. Railroad specialty prices showed some variations but on the whole remained staple.

PHILADELPHIA — The scrap market shows strength in this district, but mills are not pressing for tonnage. Dealers, with heavy inventories, continue to hold out for higher prices. Some dealers are reported to be inclined to let the material go at quoted prices. Some scrap has moved out of this district to the West. Yard inventories are still very heavy, but some dealers say they are shipping heavily on old orders. There are indications that real tonnages could not be bought at quoted prices. Turnings and low phos are quoted 50¢ higher.

NEW YORK—The market here developed some weakness and the price of No. 1 heavy melting was off $1.50 to $21.50-$22.50. Prices are expected to stabilize around present levels since the market undertone still remains firm. The turning grades are strong and in demand. Although clean cast chemical borings remained unchanged, the price shows signs of weakness. The cast grades are weak with no apparent change in demand.

DETROIT—The touch-and-go price condition of the Detroit market is continuing although there have been recent purchases of scrap by a local mill at prices somewhat lower than those quoted in IRON AGE this week. Industrial lists closing this week are reported as showing a drop in total tonnage to less than half of the November volume and this may be a factor tending to sustain the present price level. The tone of the market is reported to be firm. Cast grades, although in light demand, are holding close to last week's price level.

CLEVELAND—Mills have pulled out of the market temporarily here and in the Valley. The trade theorizes that the market went up too fast and mills' strategy will be to wait until late this month or early January before making another move. Opposed to this are railroad and industrial lists which are expected to bring about $34.00 for No. 1 and thus shore up a market that is definitely in an interim period. Foundry grades are moving at quoted prices and a general willingness on the part of dealers to unload all grades is increasing.

BOSTON—For the first time in a month, after a steady rise, a break appeared in the market here. No. 1 heavy melting is down $1.00 to $21.00-$21.50. For some of the items there is no market at the present time. Uncertainty exists and the trade is divided as to the future trend. There is no change in the cast situation in both prices and activity. The activity is not up to par.

BUFFALO—Additional sales of 5000 to 6000 tons in steelmaking grades of scrap were reported at unchanged prices, bringing the total recent business at these figures to approximately 25,000 tons. No. 2 heavy melting continues to move at $28.00, while No. 1 material brought the usual $2.00 higher differential. Dealers noted a leveling off in buying interest after these sales. Turnings and borings advanced about $1.00 on business in the Falls territory.

CINCINNATI — Heavy melting grades were weaker here this week following reported sales of representative tonnages to district consumers at $1.00 to $2.00 a ton under last week's quotations. Strategy of the mills seemed to be to exploit the temporary weakness of the market before the closing of the railroad and industrial lists inject some sympathetic strength. Foundry grades are moving at quoted prices but the tonnages are small.

ST. LOUIS—Two of the steel mills in the district came into the market during the week, one for a substantial tonnage, the other for a small lot, and at $1.00 a ton higher than previously Railroad lists are bringing higher prices. New lists include: Missouri-Kansas-Texas, 6 carloads; St. Louis-Southwestern 2000 ton; Wabash 3000 to 4000 tons; and Illinois Central 4000 tons.

BIRMINGHAM—Mills in this area are making few commitments for openhearth grades of steel due to prior large purchases. Demand for cast iron grades has increased with as much as $36.00 being paid at Birmingham for No. 1 cupola cast. Electric furnace grades are firm.

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UNIVERSITY OF MICHIGAN LIBRARIES

Pittsburgh

No. 1 hvy. melting	$31.50 to $32.00
No. 2 hvy. melting	28.50 to 29.00
No. 1 bundles	31.50 to 32.00
No. 2 bundles	26.50 to 27.00
Machine shop turn.	22.50 to 23.00
Mixed bor. and ms. turns.	22.50 to 23.00
Shoveling turnings	25.50 to 26.00
Cast iron borings	24.50 to 25.00
Low phos. plate	35.00 to 35.50
Heavy turnings	25.00 to 26.00
No. 1 RR. hvy. melting	32.50 to 33.00
Scrap rails, random lgth.	36.00 to 37.00
Rails 2 ft and under	40.00 to 41.00
RR. steel wheels	35.00 to 36.00
RR. spring steel	35.00 to 36.00
RR. couplers and knuckles	35.00 to 36.00
No. 1 machinery cast.	39.00 to 40.00
Mixed yard cast.	37.00 to 38.00
Heavy breakable cast.	29.00 to 30.00
Malleable	33.00 to 34.00

Chicago

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 factory bundles	29.00 to 30.00
No. 2 dealers' bundles	24.00 to 25.00
No. 2 dealers' bundles	25.00 to 26.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	19.00 to 20.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	19.00 to 20.00
Low phos. forge crops	34.00 to 35.00
Low phos. plate	32.00 to 33.00
No. 1 RR. hvy. melting	33.00 to 35.00
Scrap rails, random lgth.	42.00 to 43.00
Rerolling rails	47.00 to 48.00
Rails 2 ft and under	45.00 to 46.00
Locomotive tires, cut	41.00 to 42.00
Cut bolsters & side frames	38.00 to 39.00
Angles and splice bars	38.00 to 39.00
RR. steel car axles	48.00 to 49.00
No. 3 steel wheels	35.00 to 36.00
RR. couples and knuckles	35.00 to 36.00
No. 1 machinery cast.	44.00 to 45.00
No. 1 agricul. cast.	43.00 to 44.00
Heavy breakable cast.	39.00 to 40.00
RR. grate bars	33.00 to 34.00
Cast iron brake shoes	33.00 to 34.00
Cast iron car wheels	39.00 to 40.00
Malleable	39.00 to 40.00

Philadelphia

No. 1 hvy. melting	$25.00 to $26.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 bundles	25.00 to 26.00
No. 2 bundles	22.50 to 23.50
Machine shop turn.	16.50 to 17.50
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	17.50 to 18.50
Low phos. punchings, plate	27.50 to 28.50
Low phos. 5 ft and under	26.50 to 27.00
Low phos. bundles	26.50 to 27.00
Hvy. axle forge turn.	25.00 to 26.00
Clean cast chem. borings	27.00 to 28.00
RR. steel wheels	29.00 to 29.50
RR. spring steel	29.00 to 29.50
Rails 18 in. and under	38.00 to 40.00
No. 1 machinery cast	37.00 to 39.00
Mixed yard cast	35.00 to 36.00
Heavy breakable cast	34.00 to 35.00
Cast iron carwheels	36.00 to 37.00
Malleable	34.00 to 35.00

Cleveland

No. 1 hvy melting	$30.00 to $30.50
No. 2 hvy. melting	28.00 to 28.50
No. 1 busheling	30.00 to 30.50
No. 1 bundles	30.00 to 30.50
No. 2 bundles	25.00 to 25.50
Machine shop turn.	19.00 to 19.50
Mixed bor. and turn.	20.50 to 21.00
Shoveling turnings	20.50 to 21.00
Cast iron borings	20.50 to 21.00
Low phos. 2 ft and under	31.00 to 31.50
Steel axle turn.	29.00 to 29.50
Drop forge flashings	30.00 to 30.50
No. 1 RR. hvy. melting	32.00 to 32.50
Rails 3 ft and under	43.00 to 44.00
Rails 18 in. and under	45.00 to 46.00
No. 1 machinery cast.	47.00 to 48.00
RR. cast.	45.00 to 46.00
RR. grate bars	32.00 to 33.00
Stove plate	36.00 to 37.00
Malleable	38.00 to 39.00

Youngstown

No. 1 hvy. melting	$32.50 to $33.00
No. 2 hvy. melting	30.50 to 31.00
No. 1 bundles	32.50 to 33.00

Scrap IRON & STEEL Prices

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

No. 2 bundles	$27.50 to $28.00
Machine shop turn.	21.50 to 22.00
Shoveling turnings	23.00 to 23.50
Cast iron borings	23.00 to 23.50
Low phos. plate	33.00 to 34.00

Buffalo

No. 1 hvy. melting	$29.50 to $30.00
No. 2 hvy. melting	27.50 to 28.00
No. 1 busheling	27.50 to 28.00
No. 1 bundles	28.50 to 29.00
No. 2 bundles	26.00 to 26.50
Machine shop turn.	20.00 to 20.50
Mixed bor. and turn.	21.00 to 21.50
Shoveling turnings	22.50 to 23.00
Cast iron borings	21.00 to 21.50
Low phos. plate	31.00 to 32.00
Scrap rails, random lgth.	33.50 to 34.00
Rails 2 ft and under	39.50 to 40.00
RR. steel wheels	35.00 to 36.00
RR. spring steel	35.00 to 36.00
RR. couplers and knuckles	35.00 to 36.00
No. 1 cupola cast	36.00 to 37.00
Mixed yard cast	36.00 to 36.50
Stove plate	35.00 to 36.00
Small indus. malleable	24.00 to 24.50

Birmingham

No. 1 hvy. melting	$27.00
No. 2 hvy. melting	26.00
No. 2 bundles	24.00
No. 1 busheling	26.00
Machine shop turn.	$16.00 to 17.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	19.00
Bar crops and plate	31.00 to 32.00
Structural and plate	31.00 to 32.00
No. 1 RR. hvy. melt.	29.00 to 29.50
Scrap rails, random lgth.	32.00 to 33.00
Rerolling rails	39.00 to 40.00
Rails 2 ft and under	36.00 to 36.50
Angles & splice bars	35.00 to 36.00
Std. steel axles	28.00 to 29.00
No. 1 cupola cast	35.00 to 36.00
Stove plate	28.00 to 29.00
Cast iron carwheels	28.00 to 29.00

St. Louis

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	27.00 to 28.00
No. 2 bundled sheets	27.00 to 28.00
Machine shop turn.	19.00 to 20.00
Shoveling turnings	22.00 to 23.00
Rails, random lengths	35.00 to 36.00
Rails 3 ft and under	38.00 to 40.00
Locomotive tires, uncut	30.00 to 31.00
Angles and splice bars	37.00 to 38.00
Std. steel car axles	40.00 to 42.00
RR. spring steel	33.00 to 35.00
No. 1 machinery cast	37.00 to 38.00
Hvy. breakable cast.	31.00 to 32.00
Cast iron brake shoes	31.00 to 32.00
Stove plate	33.00 to 35.00
Cast iron car wheels	34.00 to 35.00
Malleable	30.00 to 32.00

New York

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$21.50 to $22.50
No. 2 hvy. melting	19.00 to 20.00
No. 2 bundles	18.00 to 19.00
Machine shop turn.	12.50 to 13.50
Mixed bor. and turn.	12.50 to 13.50
Shoveling turnings	14.00 to 15.00
Clean cast chem. bor.	24.00 to 25.00
No. 1 machinery cast.	31.00 to 32.00
Mixed yard cast.	29.00 to 30.00
Charging box cast.	27.00 to 28.00
Heavy breakable cast.	27.00 to 28.00
Unstrp. motor blocks	25.00 to 26.00

Boston

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$21.00 to $21.50
No. 2 hvy. melting	17.00 to 18.00
No. 1 bundles	21.00 to 21.50
No. 2 bundles	$16.00 to $16.50
Machine shop turn.	11.50 to 12.00
Mixed bor. and turn.	11.00 to 11.50
Shoveling turnings	13.00 to 13.50
No. 2 bushelings	13.00 to 13.50
Clean cast chem. borings	18.50 to 19.50
No. 1 machinery cast.	32.00 to 34.00
No. 2 machinery cast.	28.00 to 29.00
Heavy breakable cast.	25.00 to 26.00
Stove plate	25.00 to 26.00

Detroit

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 bundles	29.00 to 30.00
New bushelings	28.00 to 29.00
Flashings	27.00 to 28.00
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	20.00 to 21.00
Low phos. plate	29.00 to 30.00
No. 1 cupola cast	38.00 to 39.00
Heavy breakable cast.	31.00 to 32.00
Stove plate	30.00 to 31.00
Automotive cast	38.00 to 39.00

Cincinnati

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$28.00 to $28.50
No. 2 hvy. melting	26.00 to 26.50
No. 1 bundles	28.00 to 28.50
No. 2 bundles	22.00 to 22.50
Machine shop turn.	17.50 to 18.00
Mixed bor. and turn.	17.50 to 18.00
Shoveling turnings	19.50 to 20.00
Cast iron borings	18.50 to 19.00
Low phos. 18 in. under	35.00 to 36.00
Rails, random lengths	36.00 to 37.00
Rails, 18 in. and under	44.00 to 45.00
No. 1 cupola cast	41.00 to 42.00
Hvy. breakable cast	34.00 to 35.00
Drop broken cast	44.00 to 45.00

San Francisco

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bundles	16.00
No. 2 bundles	16.00
No. 3 bundles	13.00
Machine shop turn	9.00
Elec. fur 1 ft and under	28.00
No. 1 RR. hvy. melting	20.00
Scrap rails, random lgth.	20.00
No. 1 cupola cast.	$30.00 to 35.00

Los Angeles

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bundles	16.00
No. 2 bundles	16.00
No. 3 bundles	13.00
Mach. shop turn.	12.00
Elec. fur. 1 ft and under	30.00
No. 1 RR. hvy. melting	20.00
No. 1 cupola cast	$35.00 to 38.00

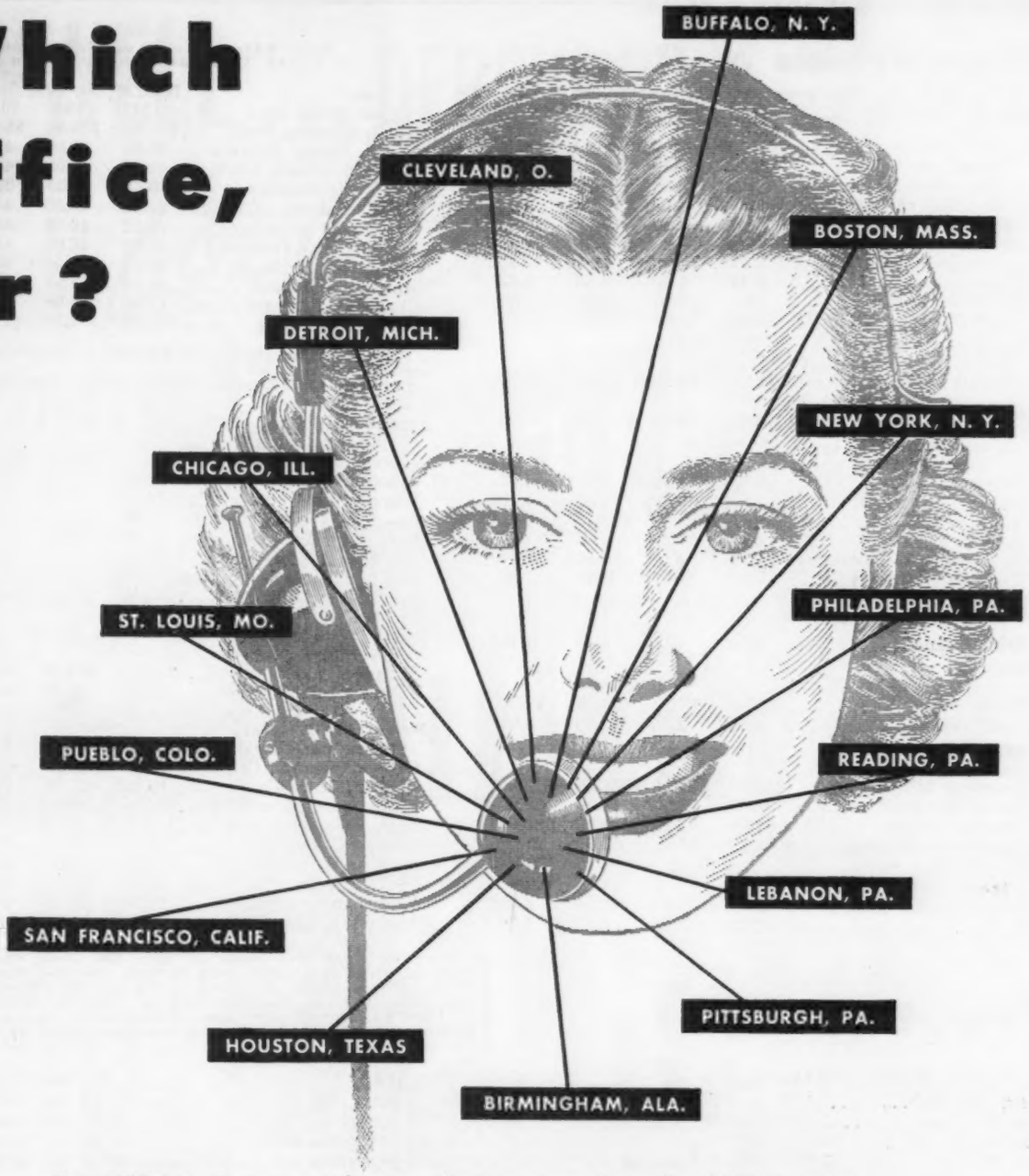
Seattle

No. 1 hvy. melting	$18.00
No. 2 hvy. melting	18.00
No. 1 bundles	16.00
No. 2 bundles	16.00
No. 3 bundles	12.00
Elec. fur. 1 ft and under	$25.00 to 28.00
RR. hvy. melting	19.00
No. 1 cupola cast	30.00
Heavy breakable cast	20.00

Hamilton, Ont.

No. 1 hvy. melting	$24.00
No. 1 bundles	16.00
No. 2 bundles	16.00
Mechanical bundles	22.00
Mixed steel scrap	20.00
Mixed bor. and turn.	18.00
Rails, remelting	24.00
Rails, rerolling	27.00
Bushelings	18.50
Bush., new fact, prep'd.	22.00
Bush., new fact, unprep'd	17.00
Short steel turnings	18.00
Cast scrap	$40.00 to 43.00

Which office, sir?



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The expansion of our organization, with offices located in 15 major cities, is in accordance with our policy to give better service to our customers.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	Nov. 29, 1949	Nov. 22, 1949	Nov. 1, 1949	Nov. 30, 1948
Hot-rolled sheets	3.25	3.25	3.25	3.26
Cold-rolled sheets	4.00	4.00	4.00	4.00
Galvanized sheets (10 ga)	4.40	4.40	4.40	4.40
Hot-rolled strip	3.25	3.25	3.25	3.265
Cold-rolled strip	4.038	4.038	4.038	4.063
Plates	3.40	3.40	3.40	3.42
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R strip (No. 302)	33.00	33.00	33.00	33.25
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes	$7.75	$7.75	$7.75	$6.80
Tinplate, electro (0.50 lb)	6.70	6.70	6.70	6.00
Special coated mfg. ternes	6.65	6.65	6.65	5.90
Bars and Shapes: (cents per pound)				
Merchant bars	3.35	3.35	3.35	3.37
Cold-finished bars	3.995	3.995	3.995	3.995
Alloy bars	3.75	3.75	3.75	3.75
Structural shapes	3.25	3.25	3.25	3.25
Stainless bars (No. 302)	28.50	28.50	28.50	28.50
Wrought iron bars	9.50	9.50	9.50	9.50
Wire: (cents per pound)				
Bright wire	4.15	4.15	4.15	4.256
Rails: (dollars per 100 lb)				
Heavy rails	$3.20	$3.20	$3.20	$3.20
Light rails	3.55	3.55	3.55	3.55
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$52.00	$52.00	$52.00	$52.00
Slabs, rerolling	52.00	52.00	52.00	52.00
Forging billets	61.00	61.00	61.00	61.00
Alloy blooms, billets, slabs	63.00	63.00	63.00	63.00
Wire rod and Skelp: (cents per pound)				
Wire rods	3.40	3.40	3.40	3.619
Skelp	3.25	3.25	3.25	3.25

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Pig Iron: (per gross ton)	Nov. 29, 1949	Nov. 22, 1949	Nov. 1, 1949	Nov. 30, 1948
No. 2, foundry, Phila.	$50.42	$50.42	$50.42	$51.56
No. 2, Valley furnace	46.50	46.50	46.50	46.50
No. 2, Southern Cin'ti	46.08	46.08	46.08	49.47
No. 2, Birmingham	39.38	39.38	39.38	43.38
No. 2, foundry, Chicago†	46.50	46.50	46.50	46.50
Basic del'd Philadelphia	49.92	49.92	49.92	50.76
Basic, Valley furnace	46.00	46.00	46.00	46.00
Malleable, Chicago†	46.50	46.50	46.50	46.50
Malleable, Valley	46.50	46.50	46.50	46.50
Charcoal, Chicago	68.56	68.56	68.56	73.78
Ferromanganese‡	173.40	173.40	173.40	161.71

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	*$31.75*	$33.75	$29.75	$42.75
Heavy melt'g steel, Phila.	25.50	25.50	22.50	44.50
Heavy melt'g steel, Ch'go	*29.50*	30.50	30.50	41.75
No. 1 hy. comp. sh't Det.	*29.50*	30.50	23.50	38.00
Low phos. Young'n	*33.75*	36.75	29.75	47.75
No. 1, cast, Pittsburgh	39.50	39.50	39.50	70.00
No. 1, cast, Philadelphia	38.00	38.00	37.00	66.50
No. 1, cast, Chicago	44.50	44.50	42.00	72.50
Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	*$14.00*	$14.25	$14.25	$15.00
Foundry coke, prompt	15.75	15.75	15.75	17.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	18.50	18.50	17.625	23.50
Copper, Lake Conn.	18.625	18.625	17.75	23.625
Tin Straits, New York	85.00	85.00	94.00	$1.03
Zinc, East St. Louis	9.75	9.75	9.50	17.50
Lead, St. Louis	11.80	11.80	12.80	21.30
Aluminum, virgin	17.00	17.00	17.00	17.00
Nickel electrolytic	42.97	42.97	42.97	42.90
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	32.00	32.00	32.00	35.00

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)

	Finished Steel Base Price	Pig Iron	Scrap Steel
Nov. 29, 1949	3.705¢ per lb.	$45.88 per gross ton	*$28.92* per gross ton
One week ago	3.705¢ per lb.	45.88 per gross ton	29.92 per gross ton
One month ago	3.705¢ per lb.	45.88 per gross ton	27.58 per gross ton
One year ago	3.720¢ per lb.	46.91 per gross ton	43.00 per gross ton

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Scrap Steel High	Scrap Steel Low
1949	3.720¢ Jan. 1	3.705¢ May 3	$46.82 Jan. 4	$45.88 Sept. 6	$43.00 Jan. 1	$19.33 June 28
1948	3.721¢ July 27	3.193¢ Jan. 1	46.91 Oct. 12	39.58 Jan. 6	43.16 July 27	39.75 Mar. 9
1947	3.193¢ July 29	2.848¢ Jan. 1	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946	2.848¢ Dec. 31	2.464¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.464¢ May 29	2.396¢ Jan. 1	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.396¢	2.396¢	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.396¢	2.396¢	23.61	23.61	$19.17	$19.17
1942	2.396¢	2.396¢	23.61	23.61	19.17	19.17
1941	2.396¢	2.396¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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STEEL PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middletown	Youngstown	Bethlehem	Buffalo	Conshohocken	Johnstown	Sparrows Point	Granite City	Detroit
INGOTS Carbon forging, net ton	$50.00 1													$50.00 81
Alloy, net ton	$51.00 1.17													$51.00 81
BILLETS, BLOOMS, SLABS Carbon, rerolling net ton	$52.00 1	$52.00 1	$52.00 1				$57.00 13		$52.00 3	$57.00 26	$52.00 3			
Carbon forging billets, net ton	$61.00 1	$61.00 1.4	$61.00 1.3	$61.00 4			$61.00 23		$61.00 3.4	$63.00 26	$61.00 3			$61.00 81
Alloy, net ton	$63.00 1.17	$63.00 1.4	$63.00 1		$63.00 4.42		$63.00 13	$63.00 3	$63.00 3.4	$65.00 26	$63.00 3			$63.00 81
SHEET BARS							$57.00 13							
PIPE SKELP	3.25 1.5						3.25 1.4							
WIRE RODS	3.40 2.18	3.40 2.4.33	3.40 6	3.40 2			3.40 6				3.40 3	3.50 3		
SHEETS Hot-rolled (18 ga. & hvr.)	3.25 1.5.9.15	3.25 23	3.25 1.6.8	3.25 4.5			3.25 1.4.6.13		3.25 3	3.35 26		3.25 3		3.45 13
Cold-rolled	4.00[1.5] 7.9.15.62		4.00 1.6.8	4.00 4.5		4.00 7	4.00 4.6		4.00 3			4.00 3	4.20 22	4.20 13
Galvanized (10 gage)	4.40 1.9.15		4.40 1.8		4.40 4		4.40[64] 5.65[44]					4.40 3		
Enameling (12 gage)	4.40 1		4.40 1.8	4.40 4		4.40 7	4.40 6						4.60 22	4.70 13
Long ternes (10 gage)	4.80 9.15		4.80 1			4.80 7								
Hi Str. low alloy, h.r.	4.95 1.5.9	4.95 1	4.95 1.6.8	4.95 4.5			4.95 1.4.6.13		4.95 3	4.95 26		4.95 3		5.15 13
Hi Str. low alloy c.r.	6.05 1.5		6.05 1.6.8	6.05 4.5			6.05 4.6.13		6.05 3			6.05 3		6.25 13
Hi Str. Low alloy, galv.	6.75 1			6.75 4	6.75 4							6.75 3		
STRIP Hot-rolled (over 6 in.)	3.25 5.7.9.28	3.25 23.66	3.25 1.6.8	3.25 5			3.25 1.4.6.13		3.25 3			3.25 3		3.45 13.47
Cold-rolled	4.00 5.7.9.62	4.15 66	4.00 8	4.00 2.5		4.00 7	4.00 4.6.13.40.45.49		4.00 3			4.00 3		4.20[13.47] 4.25[60.61]
Hi Str. low alloy, h.r.	4.95 5		4.95 1.6.8	4.95 5			4.95 1.4.6.13		4.95			4.95 3		5.15 13
Hi Str. low alloy c.r.	6.05 5.9			6.05 2.5			6.05 4.6.13		6.05 3			6.05 3		6.25 13
TINPLATE† Cokes, 1.50-lb. base box	$7.75 1.5.9.16		$7.75 1.6.8				$7.75 4					$7.85 8	$7.95 22	
Electrolytic 0.25, 0.50, 0.75 lb bo	Deduct $1.30, $1.05 and 75¢ respectivel from 1.50-lb coke base box price													
BLACKPLATE, 29 gage Hollowware enameling	5.30 1.5.15		5.30 1.6.8				5.30 4					5.40 3	5.60 22	
BARS Carbon steel	3.35 1.5.9.17	3.35 1.4.23	3.35 1.6.8	3.35 4	3.35 4		3.35 1.4.6		3.35 3.4		3.35 3			3.55 13
Reinforcing‡	3.35 1.5	3.35 4	3.35 1.6.8	3.35 4	3.35 4		3.35 1.4.6		3.35 3.4		3.35 3	3.35 3		
Cold-finished	3.95[5] 4.00[2.4] 17.52.69.71	4.00[2] 23.69.70	4.00 4.73.74	4.00 2.61	4.00 4.62		4.00 6.45.57		4.00 70					4.30 13
Alloy, hot-rolled	3.75 1.17	3.75 1.4.23	3.75 1.6.8		3.75 4.42		3.75 1.6.25	3.75 3	3.75 3.4		3.75 3			4.05 13
Alloy, cold-drawn	4.65 2.17.52.69.71	4.65 2.23.69.70	4.65 4.73.74	4.65 2.61	4.65 4.42.62		4.65 6.25.57	4.65 3	4.65 3.70					
Hi Str. low alloy, h.r.	5.10 1.5		5.10 1.6.8	5.10 4			5.10 1.6	5.10 3	5.10 3		5.10 3			5.30 13
PLATE Carbon Steel	3.40 1.5	3.40 1	3.40 1.6.8	3.40 4			3.40 13		3.40 3	3.50 26	3.40 3	3.40 3		3.65 3
Floor plates	4.55 1	4.55 1	4.55 8	4.55 5						4.55 26				
Alloy	4.40 1	4.40 1	4.40 1				4.40 13			4.40 26	4.40 3	4.40 3		
Hi St. low alloy	5.20 1.5	5.20 1	5.20 1.8	5.20 4.5			5.20 6			5.20 26	5.20 3	5.20 3		5.45 13
SHAPES, Structural	3.25 1.5.9	3.25 1.23	3.25 1.6.8					3.30 3	3.30 3		3.30 3			
Hi Str. low alloy	4.95 1.5	4.95 1	4.95 1.6.8				4.95 6	5.05 3	5.05 3		5.05 3			
MANUFACTURERS' WIRE Bright	4.15 2.5.18	4.15[3] 4.33.34		4.15 2.77			4.15 6				4.15 3	4.25	Duluth=4.15[2] Pueblo=4.50[14]	
PILING, Steel sheet	4.05 1.9	4.05 1							4.05 3					

UNIVERSITY OF MICHIGAN LIBRARIES

STEEL PRICES

Smaller numbers indicate producing companies. See key at right. Prices are in cents per lb unless otherwise noted. Extras apply.

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana		
					INGOTS Carbon forging, net ton
	$88.00 83				Alloy, net ton
		$82.00 11	F=$71.00[19]		BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton
	$89.00 83	$61.00 11	F=$80.00[19]	Geneva=$61.00[16]	Carbon forging billets, net ton
	$71.00 83		F=$82.00[19]		Alloy net ton
				Mansfield=$58.00 G. T.[78] Portsmouth=$55.00[20]	SHEET BARS
					PIPE SKELP
	3.95 83		SF, LA=4.05[24] LA=4.20[62]	Portsmouth=3.40[20] Worcester=3.70[3]	WIRE RODS
		3.25 4.11	LA=3.95[24] F=4.15[19]	Kokomo,[30] Ashland[7]=3.25	SHEETS Hot-rolled (18 ga. & hvr.)
		4.00 11	SF=4.95[24] F=4.90[19]		Cold-rolled
		4.40 4.11	SF, LA=5.15[24]	Ashland=4.40[7]	Galvanized (10 gage)
					Enameling (12 gage)
					Long ternes (10 gage)
		4.95 11			Hi Str low alloy, h.r.
					Hi Str. low alloy, c.r.
					Hi Str. low alloy, galv.
3.85 83	3.85 83	3.25 11	SF, LA=4.00[62] F=4.40[19], S=4.25[62]	Ashland=3.25[7] Atlanta=3.40[65]	STRIP Hot-rolled
			F=4.90[19]	New Haven=4.50[2-48]	Cold-rolled
		4.95 11			Hi Str. low alloy, h.r.
			F=6.95[19]		Hi Str low alloy, c.r
		$7.85 11	SF=$8.50[24]		TINPLATE Cokes, 1.50-lb, base box
Deduct $1.30, $1.05 and 75¢ respectively from 1.50-lb coke base box price					Electrolytic 0.25, 0.50, 0.75 lb box
					BLACKPLATE, 29 gage Hollowware enameling
3.85 83	3.75 83	3.35 4.11	SF, LA=4.05[24] LA=4.05[62]	Atlanta=3.50[65]	BARS Carbon steel
3.85 83	3.75 83	3.35 4.11	SF, S=4.15[62] F=4.00[19]	Atlanta=3.50[65]	Reinforcing††
				Putnam, Newark=4.40[69] Cumberland=3.95[73]	Cold-finished
4.35 83			LA=4.80[62] F=4.75[19]		Alloy, hot-rolled
				Newark,[69] Worcester[3]=4.95	Alloy, cold-drawn
		5.10 4			Hi Str. low alloy, h.r.
	3.80 83	3.40 4.11	F=4.00[19] S=4.30[62] Geneva=3.40[16]	Claymont=3.50[29] Coatesville=3.50[21] Harrisburg=3.75[35]	PLATE Carbo steel
				Harr'sburg=4.55[35]	Floor plates
				Coatesville=4.50[21]	Alloy
		5.20 11		Geneva=5.20[16]	Hi Str. low alloy
3.85 83	3.85 83	3.25 11	SF=3.80[62] LA=3.85,[62] 3.95[24]		SHAPES, Structural
		4.95 11	F=3.80[19] S=3.90[62]		Hi Str. low alloy
4.75 83	4.55 83	4.15 4.11	SF, LA=5.10[24] LA=5.10[62]	Portsmouth=4.15[20] Worcester=4.45[3]	MANUFACTURERS' WIRE Bright

Notes: †Special coated mfg ternes, deduct $1.10 from 1.50-lb coke base box price. Can-making quality blackplate, 55 to 128-lb, deduct $2.00 from 1.50-lb coke base box. ‡Straight lengths only from producer to fabricator.

KEY TO STEEL PRODUCERS

With Principal Offices

1 Carnegie-Illinois Steel Corp., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Armco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R.R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va.
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Co., Inc., Oakland, Calif.
20 Portsmouth Steel Corp., Portsmouth, Ohio
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill.
23 Wisconsin Steel Co., South Chicago, Ill.
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Midvale Co., Philadelphia
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Worth Steel Co., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., St. Louis
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Iron & Steel Co., Harrisburg, Pa.
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa.
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
44 Reeves Steel & Mfg. Co., Dover, Ohio
45 John A. Roebling's Sons Co., Trenton, N. J.
46 Simonds Saw & Steel Co., Fitchburg, Mass.
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52 Superior Drawn Steel Co., Monaca, Pa.
53 A. M. Byers Co., Pittsburgh
54 Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
55 Ingersoll Steel Div., Chicago
56 Latrobe Electric Steel Co., Latrobe, Pa.
57 Fitzsimons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
60 Vanadium-Alloys Steel Co., Latrobe, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel Corp., San Francisco
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wyckoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Indianapolis
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forgings Corp., Chicago
80 Driver Harris Co., Harrison, N. J.
81 Detroit Tube & Steel Div., Detroit
82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
83 Sheffield Steel Corp., Kansas City

UNIVERSITY OF MICHIGAN LIBRARIES

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base Column	Pittsburg, Calif.
Standard & coated nails*	103	122
Woven wire fence†	109	132
Fence posts, carloads††	112	...
Single loop bale ties	106	130
Galvanized barbed wire**	123	143
Twisted barbless wire	123	...

* Pgh., Chi., Duluth; Worcester, 6 columns higher; Houston, 8 columns higher; Kansas City, 12 Columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth, Joliet and Johnstown.

	Base per 100 lb	Pittsburg, Calif.
Annealed fence wire‡	$4.80	$5.75
Annealed, galv. fencing‡	5.25	6.20
Cut nails, carloads‡‡	6.75	...

‡ Add 30¢ at Worcester; 10¢ at Sparrows Pt.

‡‡ Less 20¢ to jobbers.

PRODUCING POINTS — *Standard, coated or galvanized nails, woven wire fence, bale ties, and barbed wire:* Alabama City, Ala., 4; Atlanta, 65; Aliquippa, Pa. (except bale ties), 5; Bartonville, Ill. (except bale ties), 34; Chicago, 4; Donora, Pa., 2; Duluth, 2; Fairfield, Ala., 11; Johnstown, Pa. (except bale ties), 3; Joliet, Ill., 2; Kokomo, Ind., 30; Minnequa, Colo., 14; Monessen, Pa. (except bale ties), 18; Pittsburg, Calif., 24; Portsmouth, Ohio, 20; Rankin, Pa. (except bale ties), 2; Sparrows Point (except woven fence), 3; Sterling, Ill., 33; San Francisco (except nails and woven fence), 14; Torrance, Calif. (nails only), 24; Worcester (nails only), 2; Houston (except bale ties), 83; Kansas City (except bale ties), 83.

Fence posts: Duluth, 2; Johnstown, Pa., 3; Joliet, Ill., 2; Minnequa, Colo., 14; Moline, Ill., 4; Williamsport, Pa., 51.

Cut nails: Wheeling, W. Va., 15; Conshohocken, Pa., 26.

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct,		
Coatesville, Pa. (21)	*26.50	
Washgtn, Pa. (39)	*26.50	
Claymont, Del. (29)	*26.50	
Conshohocken, Pa. (26)		*22.50
New Castle, Ind. (55)	*26.50	*24.00
Nickel-carbon		
10 pct, Coatesville, (26)	27.50	
Inconel-carbon		
10 pct, Coatesville, (21)	36.00	
Monel-carbon		
10 pct, Coatesville, (21)	29.00	
No. 302 Stainless-copper-stainless, Carnegie, Pa. (41)		75.00
Aluminized steel sheets, hot dip, Butler, Pa., (7)		7.75

* Includes annealing and pickling, or sandblasting.

ELECTRICAL SHEETS

24 gage, HR cut lengths, f.o.b. mill

	Cents per lb
Armature	5.45
Electrical	5.95
Motor	6.70
Dynamo	7.50
Transformer 72	8.05
Transformer 65	8.60
Transformer 58	9.30
Transformer 52	10.10

PRODUCING POINTS—Beech Bottom, W. Va., 18; Brackenridge, Pa., 28; Follansbee, W. Va., 63; Granite City, Ill., 22; Indiana Harbor, Ind., 8; Mansfield, Ohio, 75; Niles, Ohio, 64, 76; Toronto, Ohio, 63; Vandergrift, Pa. 1; Warren, Ohio, 4; Zanesville, Ohio, 7.

Numbers after producing points correspond to steel producers. See key on Steel Price page.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Pct Off List
½ in. & smaller x 6 in. & shorter	35
9/16 & ⅝ in. x 6 in. & shorter	37
¾ in. & larger x 6 in. shorter	34
All diam., longer than 6 in.	30
Lag, all diam over 6 in. & longer	35
Lag, all diam x 6 in. & shorter	37
Plow bolts	47

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	35
9/16 to 1 in. inclusive	34
1⅛ to 1½ in. inclusive	32
1⅝ in. and larger	27

On above bolts and nuts, excepting plow bolts, additional allowances of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifinished Hexagon Nuts

	USS	SAE
7/16 in. and smaller	..	41
½ in. and smaller	38	..
½ in. through 1 in.	..	39
9/16 in. through 1 in.	37	..
1⅛ in. through 1½ in.	35	37
1⅝ in. and larger	28	..

In full case lots, 15 pct additional discount.

Stove Bolts

Packages, nuts separate	$61.75
In bulk	70.00

Large Rivets

(½ in. and larger)

	Base per 100 lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$6.75
F.o.b. Lebanon, Pa.	6.75

Small Rivets

(7/16 in. and smaller)

	Pct off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	43

Cap and Set Screws

(In packages)	Pct Off List
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	46
¾ to 1 in. x 6 in., SAE (1035), heat treated	35
Milled studs	19
Flat head cap screws, listed sizes	5
Fillister head cap, listed sizes	23

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon	4.00¢
0.41 to 0.60 carbon	5.50¢
0.61 to 0.80 carbon	6.10¢
0.81 to 1.05 carbon	8.05¢
1.06 to 1.35 carbon	10.35¢

Worcester, add 0.30¢.

LAKE SUPERIOR ORES

(51.50% Fe; natural content, delivered lower lake ports)

	Per gross ton
Old range, bessemer	$7.60
Old range, nonbessemer	7.45
Mesabi, bessemer	7.35
Mesabi, nonbessemer	7.20
High phosphorus	7.20

After Dec. 31, 1948, increases or decreases in Upper Lake freight, dock and handling charges and taxes thereon to be for the buyers' account.

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb	$3.1
Joint bars, per 100 lb	4.2
Light rails per 100 lb	3.1

	Base Price cents per lb
Track spikes†	5.3
Axles	5.3
Screw spikes	5.9
Tie plates	4.0
Tie plates, Pittsburgh, Torr., Calif.*	4.3
Track bolts, untreated	5.3
Track bolts, heat treated, to railroads	5.5

*Seattle, add 30¢.

†Kansas City, 5.60¢.

PRODUCING POINTS—*Standard rails:* Bessemer, Pa., 1; Ensley, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Minnequa, Colo., 14; Steelton, Pa., 3.

Light rails: All the above except Indiana Harbor and Steelton, plus Fairfield, Ala., 11; Johnstown, Pa. 3; Minnequa, Colo., 14.

Joint bars: Bessemer, Pa., 1; Fairfield, Ala., 11; Indiana Harbor, Ind., 8; Joliet, Ill., 1; Lackawanna, N. Y., 3; Steelton, Pa., 3; Minnequa, Colo., 14.

Track spikes: Fairfield, Ala., 11; Indiana Harbor, Ind., 6, 8; Lebanon, Pa. 3; Minnequa, Colo., 14; Pittsburgh, 5; Chicago, 4; Struthers, Ohio, 6; Youngstown, 4.

Track bolts: Fairfield, Ala., 11; Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 77, 78.

Axles: Fairfield, Ala., 11; Gary, 1; Indiana Harbor, Ind., 79; Johnstown, Pa. 3; McKees Rocks, Pa., 1.

Tie plates: Fairfield, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Pittsburg, Calif., 24; Pittsburgh, 4; Seattle, 62; Steelton, Pa., 3; Torrance, Calif., 24; Minnequa, Colo., 14.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$0.5
18	4	1	—	5	$1.0
18	4	2	—	—	$1.0
1.5	4	1.5	8	—	6
6	4	2	6	—	6

High-carbon-chromium	5
Oil hardened manganese	3
Special carbon	2
Extra carbon	2
Regular carbon	1

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

COKE

Furnace, beehive (f.o.b. oven)	Net To
Connellsville, Pa.	$13.50 to $14
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	$15.50 to $16
Foundry, oven coke	
Buffalo, del'd	$20
Chicago, f.o.b.	20
Detroit, f.o.b.	19
New England, del'd	23
Seaboard, N. J., f.o.b.	22
Philadelphia, f.o.b.	20
Swedeland, Pa., f.o.b.	20
Plainesville, Ohio, f.o.b.	20
Erie, del'd	$20.25 to $21
Cleveland, del'd	22
Cincinnati, del'd	21
St. Paul, f.o.b.	23
St. Louis, del'd.	21
Birmingham, del'd	18

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars Rosiclare, Ill. Base price, per ton net: Effective CaF, content:

70% or more	$37.00
60% or less	34.00

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	12.75	13.50	15.00	14.50	22.75	18.25	20.00	11.25	13.75	11.50
Slabs, billets, rerolling	17.00	18.25	20.25	19.25	30.25	24.50	26.75	15.00	18.50	15.25
Forg. discs, die blocks, rings	30.50	30.50	33.00	32.00	49.00	38.50	41.00	24.50	25.00	25.00
Billets, forging	24.25	24.25	26.25	25.50	39.00	29.00	32.75	19.50	20.00	20.00
Bars, wire, structurals	28.50	28.50	31.00	30.00	46.00	34.00	38.50	23.00	23.50	23.50
Plates	32.00	32.00	34.00	34.00	50.50	39.50	44.00	26.00	26.50-27.00	26.50
Sheets	37.50	37.50	39.50	39.50	53.00	45.50	50.00	33.00	33.50	33.50
Strip, hot-rolled	24.25	25.75	30.00	27.75	46.00	34.50	38.75	21.25	28.00	21.75
Strip, cold-rolled	30.50	33.00	36.50	35.00	55.00	44.50	48.50	27.00	33.50	27.50

Numbers correspond to producers. See Key on Steel Price Page.

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38, 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Lockport, N. Y., 46.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38; W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 49; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, 13; Butler, Pa., 7.

Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago 1, 67; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Chicago, 67; Trenton, N. J., 45; Harrison N. J., 80; Baltimore, 7; Dunkirk, 28.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44.

Plates: Brackenridge, Pa., 28; Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks, rings: Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28.

Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1.

REFRACTORIES (*F.o.b. works*)

Fire Clay Brick — *Carloads, Per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5) $80.00
No. 1 Ohio 74.00
Sec. quality, Pa., Md., Ky., Mo., Ill. 74.00
No. 2 Ohio 66.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50) 11.50

Silica Brick

Mt. Union, Pa., Ensley, Ala. $80.00
Childs, Pa. 84.00
Hays, Pa. 85.00
Chicago District 89.00
Western, Utah and Calif. 95.00
Super Duty, Hays, Pa., Athens, Tex. .... $85.00 to 95.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.) .. $13.75 to 14.00
Silica cement, net ton, bulk, Hays, Pa. 16.00
Silica cement, net ton, bulk, Ensley, Ala. 15.00
Silica cement, net ton, bulk, Chicago District .... $14.75 to 15.00
Silica cement, net ton, bulk, Utah and Calif. 21.00

Chrome Brick — *Per Net Ton*

Standard chemically bonded, Balt., Chester $69.00

Magnesite Brick

Standard, Baltimore $91.00
Chemically bonded, Baltimore 80.00

Grain Magnesite — *Std. ⅜-in. grains*

Domestic, f.o.b. Baltimore, in bulk, fines removed ... $56.00 to $56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines .... 30.50 to 31.00
in sacks with fines .... 35.00 to 35.50

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk, Midwest, add 10¢; Missouri Valley, add 20¢ $12.25

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f. New York, ocean bags .... 7.4¢ to 9.0¢
Domestic sponge iron, 98+% Fe, carload lots .... 9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe .... 31.5¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe .... 48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe .. 63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 microns, 98%, 99.8+% Fe 90.0¢ to $1.75
Aluminum .... 29.00¢
Antimony .... 45.78¢
Brass, 10 ton lots .... 22.75¢ to 25.75¢
Copper, electrolytic .... 28.625¢
Copper, reduced .... 28.50¢
Cadmium $2.40
Chromium, electrolytic, 99% min. $3.50
Lead .... 19.92¢
Manganese .... 55.00¢
Molybdenum, 99% $2.65
Nickel, unannealed .... 61.00¢
Nickel, spherical, minus 30 mesh, unannealed .... 68.00¢
Silicon .... 34.00¢
Solder powder .... 8.5¢ plus metal cost
Stainless steel, 302 .... 75.00¢
Tin $1.06
Tungsten, 99% $2.90
Zinc, 10 ton lots .... 15.50¢ to 18.25¢

ELECTRODES

Cents per lb, f.o.b. plant, threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb
	GRAPHITE	
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
	CARBON	
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
17 to 20	84, 90	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

PIPE AND TUBING

Base discounts, f.o.b. mills
Base price, about $200.00 per net ton

Standard, Threaded and Coupled

	Black	*Galv*
Steel, buttweld*		
⅛-in.	43 to 41	26½ to 24½
¼-in.	46 to 44	30½ to 28½
⅜-in.	48½ to 46½	33½ to 31½
½-in.	49 to 47	34 to 32
¾-in.	49½ to 47½	34½ to 32½
1-in.	50 to 48	35 to 33
1¼ to 3-in.	50½ to 48½	35½ to 33½
Steel, lapweld		
2-in.	39½	26 to 24
2½ to 3-in.	43½ to 42½	28 to 27
3½ to 6-in.	46½ to 42½	31 to 27
Steel, seamless		
2-in.	38½	23
2½ to 3-in.	41½	26
3½ to 6-in.	43½	28
Wrought Iron, buttweld		
⅛-in.	+20½	+47
¼-in.	+10½	+36
⅜ & 1¼ in.	+ 4½	+27
2-in.	— 1½	+23½
3-in.	— 2	+23
Wrought Iron, lapweld		
2-in.	+ 7½	+31
2½ to 3½-in.	+ 5	+26½
4-in.	list	+20½
4½ to 8-in.	+ 2	+22

Extra Strong, Plain Ends

Steel, buttweld		
⅛-in.	42 to 40	27 to 25
¼-in.	46 to 44	31 to 29
⅜-in.	48 to 46	34 to 32
½-in.	48½ to 46½	34½ to 32½
¾-in.	49 to 47	35 to 33
1-in.	49½ to 47½	35½ to 34½
1¼ to 3-in.	50 to 48	36 to 34
Steel, lapweld		
2-in.	39½ to 38½	25 to 24
2½ to 3-in.	44½ to 42½	30 to 28
3½ to 6-in.	48 to 44	33½ to 31½
Steel, seamless		
2-in.	37½	23
2½ to 3-in.	41½	27
3½ to 6-in.	45	30½
Wrought Iron, buttweld		
⅛-in.	+16	+40
¼-in.	+ 9½	+34
⅜ to 2-in.	— ½	+ 23
Wrought Iron, lapweld		
2-in.	+ 4½	+27½
2½ to 4-in.	— 5	+16
4½ to 6-in.	— 1	+20½

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct.
*Fontana, Calif., deduct 11 points from figures in left columns.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut length 4 to 24 ft inclusive.

OD in in.	Gage BWG	Seamless H.R.	Seamless C.R.	Electric Weld H.R.	Electric Weld C.D.
2	13	$19.18	$22.56	$18.60	$21.89
2½	12	25.79	30.33	25.02	29.41
3	12	28.68	33.76	27.82	32.74
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78

CAST IRON WATER PIPE

Per net ton

6 to 24-in., del'd Chicago $95.70
6 to 24-in., del'd N. Y. .... $92.50 to 97.40
6 to 24-in., Birmingham 82.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less 109.30
Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, dollars per 100 lb. (Metropolitan area delivery, add 15c to base price except Cincinnati and New Orleans (*), add 10c; New York, Chicago and Boston, add 20c).

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Baltimore	5.31	6.21–6.41	6.95–7.11	5.37	....	5.56	5.36	5.42	6.16	....	9.60–10.10	....	....
Birmingham	4.85	5.75	6.15	4.85	....	5.10	4.90	4.90	6.59	....	....	....	....
Boston	5.55	6.45–6.75	7.11–7.61	5.60	6.75	5.75	5.42	5.52	6.02	9.36–9.67	9.67–9.87	10.72	11.32
Buffalo	4.85	5.75	7.42–7.57	5.24	7.27	5.35	5.00	4.95	5.40	9.30	9.60	10.65	10.95
Chicago	4.85	5.75	6.95	4.85	5.45–6.15	5.10	4.90	4.90	5.40	8.90	9.20	10.25	10.55
Cincinnati*	5.16–5.51	5.84–6.28	6.59–6.93	5.28–5.43	....	5.53–5.85	5.33	5.33–5.48	6.08–6.20	9.74	9.99	11.19	11.44
Cleveland	4.85	5.75	6.70	5.03	....	5.21	5.01	5.01	5.45	9.05	9.35	10.40	10.70
Detroit	5.28–5.32	6.07–6.18	7.36–7.58	5.27–5.47	6.27–6.58	5.52–5.57	5.33–5.40	5.33–5.55	6.00–6.18	9.67	9.92	11.11	11.36
Houston	6.70–6.95	....	7.30	6.70	....	6.70	6.20–6.70	6.40–6.65	7.60	10.45	10.40	11.45	11.70
Indianapolis	5.29	6.13	7.44	5.29	7.36	5.54	5.34	5.34	6.14	11.25	11.39	....	....
Kansas City	5.50	6.40	7.50	5.50	6.98[5]	5.75	5.55	5.55	6.10	9.55	9.85	10.90	11.20
Los Angeles	5.45[17]	7.00	7.40[17]	5.95[17]	7.35[17]	5.50[17]	5.45[17]	5.60[17]	7.25[6]	9.55[21]	9.75[21]	10.95[21]	11.35[21]
Memphis	5.75–5.80	6.60	7.20	5.80–5.95	6.80	5.95–6.00	5.75	5.75	6.33	....	....	....	....
Milwaukee	5.03	5.93	7.02	5.03–5.38	6.32	5.28	5.08	5.08	5.63	9.08	9.38	10.43	10.73
New Orleans*	5.95	6.75	....	6.15	....	6.15	5.95	5.95	6.65[6]	....	....	....	....
New York	5.40	6.31	6.85–6.90	5.62	6.76	5.65	5.33	5.57	6.31	9.28	9.58	10.63	10.93
Norfolk	6.00	....	....	6.20	....	6.05	6.05	6.05	7.05	....	....	....	....
Omaha	6.13	....	8.33	6.13	....	6.38	6.18	6.18	6.98	....	....	....	....
Philadelphia	4.95	6.24[13]	6.63	5.40	6.29	5.35	5.10	5.40	5.98	9.05	9.35	10.62	10.87
Pittsburgh	4.85	5.75	6.90	5.00	6.00	5.05	4.90	4.90	5.40	8.90	9.20	10.25	10.55
Portland	6.50[8]–7.05	8.00	8.80–9.10	6.85[3]	....	6.30[6]	6.35[3]	6.35[3]	8.25[14]	10.50[6]	10.10[6]	....	....
Salt Lake City	7.05	7.05	8.65	7.45[3]	....	5.65[3]	5.50[3]	7.10[6]	8.15	....	....	....	....
San Francisco	6.15[5]	7.80[2]	8.65–7.80	6.75[3]	8.25[5]	6.35[3]	5.90[6]	5.90[6]	7.55	9.80	10.00	11.20	11.50
Seattle	6.70[4]–7.10	8.15[2]–8.65	8.80–9.30	6.70[4]	....	6.35[4]	6.30[4]	6.20[4]	8.15[14]	....	10.35[15]	....	13.10
St. Louis	5.22–5.37	6.12–6.27	7.32	5.22	6.68–7.54	5.47	5.27	5.27	5.82	9.27–9.72	9.57–9.97	10.82–11.17	10.92–11.42
St. Paul	5.44	6.19–6.34	7.54–7.84	5.44	6.82	5.84–6.89	5.49	5.49	6.04	9.49	9.79	10.84	11.14

BASE QUANTITIES *Standard unless otherwise keyed on prices.*

Hot-Rolled:
Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

Cold-Rolled:
Sheets, 400 to 1499 lb strip, extras on all quantities. Bars 1000 lb and over.

Alloy Bars:
1000 to 1999 lb.

Galvanized Sheets:
450 to 1499 lb.

Exceptions:
(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb; (18) 1000 to 1499 lb; (19) 1500 to 3499 lb; (20) 6000 lb and over; (21) 2000 to 3999 lb.

PIG IRON PRICES

Dollars per gross ton. Delivered prices do not include 3 pct tax on freight.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00	48.50	49.00	49.50	.....
Birmingham	38.88	39.38	.....	.....	.....
Buffalo	46.00	46.50	47.00	.....	.....
Chicago	46.00	46.50	46.50	47.00	.....
Cleveland	46.00	46.50	46.50	47.00	51.00
Duluth	46.00	46.50	46.50	47.00	.....
Erie	46.00	46.50	46.50	47.00	.....
Everett	.....	50.50	51.00	.....	.....
Granite City	47.90	48.40	48.90	.....	.....
Ironton, Utah	46.00	46.50	.....	.....	.....
Pittsburgh	46.00	46.50	46.50	47.00	.....
Geneva, Utah	46.00	46.50	.....	.....	.....
Sharpsville	46.00	46.50	46.50	47.00	.....
Steelton	48.00	48.50	49.00	49.50	54.00
Struthers, Ohio	46.00	.....	.....	.....	.....
Swedeland	48.00	48.50	49.00	49.50	.....
Toledo	46.00	46.50	46.50	47.00	.....
Troy, N. Y.	48.00	48.50	49.00	.....	54.00
Youngstown	46.00	46.50	46.50	47.00	.....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Producing Point	Rail Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	.....	50.50	51.00	.....	.....
Boston	Steelton	6.90	.....	.....	.....	.....	60.90
Brooklyn	Bethlehem	4.29	.....	52.79	53.29	53.79	.....
Cincinnati	Birmingham	6.70	45.58	46.08	.....	.....	.....
Jersey City	Bethlehem	2.63	.....	51.13	51.63	52.13	.....
Los Angeles	Geneva-Ironton	7.70	53.70	54.20	.....	.....	.....
Mansfield	Cleveland-Toledo	3.33	49.33	49.83	49.83	50.33	54.33
Philadelphia	Bethlehem	2.39	50.39	50.89	51.39	51.89	.....
Philadelphia	Swedeland	1.44	49.44	49.94	50.44	50.94	.....
Philadelphia	Steelton	3.09	.....	.....	.....	.....	57.09
Rochester	Buffalo	2.63	48.63	49.13	49.63	.....	.....
San Francisco	Geneva-Ironton	7.70	53.70	54.20	.....	.....	.....
Seattle	Geneva-Ironton	7.70	53.70	54.20	.....	.....	.....
St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	.....	.....
Syracuse	Buffalo	3.58	49.58	50.08	50.58	.....	.....

Producing point prices are subject to switching charges; silicon differential (not to exceed 50c per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct for foundry iron); phosphorus differentials, a reduction of 38c per ton for phosphorus content of 0.70 pct and over manganese differentials, a charge not to exceed 50c per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.01 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio—$59.50; f.o.b. Buffalo, $60.75. Add $1.00 per ton for each additional 0.50 pct $1 up to 17 pct. Add 50c per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $60.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $68.56. High phosphorus charcoal pig iron is not being produced.

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FERROALLOYS

Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size.
F.o.b. Birmingham $174
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont. $172
F.o.b. Johnstown, Pa. $174
F.o.b. Sheridan, Pa. $172
F.o.b. Etna, Clairton, Pa. $175
$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.
Briquets—Cents per pound of briquet, delivered, 66% contained Mn.
Carload, bulk 10.45
Ton lots 12.05
Less ton lots 12.95

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$64.00	$65.00
Pgh. or Chicago	65.00	66.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.
Carload, packed 35.5
Ton lots 37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.
Carloads 28
Ton lots 30
Less ton lots 32

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	25.25	27.10	28.30
0.10% max. C	24.75	26.60	27.80
0.15% max. C	24.25	26.10	27.30
0.30% max. C	23.75	25.60	26.80
0.50% max. C	23.25	25.10	26.30
0.75% max. C, 7.00% max. Si	20.25	22.10	23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.
Carload bulk 8.95
Ton lots 10.60
Briquet, contract basis carlots, bulk delivered, per lb of briquet 10.30
Ton lots 11.90
Less ton lots 12.80

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $77.00 gross ton, freight allowed to normal trade area; Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $73.50. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.
96% Si, 2% Fe 20.70
97% Si, 1% Fe 21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.
Carload, bulk 6.30
Ton lots 7.90
Less ton lots 8.80

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size, bulk, in carloads, delivered.
25% Si 17.00
50% Si 11.30
75% Si 13.50
85% Si 14.65
90-95% Si 16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si)
0.06% C 28.75
0.10% C 28.25
0.15% C 28.00
0.20% C 27.75
0.50% C 27.50
1.00% C 27.25
2.00% C 27.00
65-69% Cr, 4-9% C 20.50
62-66% Cr, 4-6% C, 6-9% Si 21.35
Briquets — Contract price, cents per pound of briquet, delivered, 60% chromium.
Carload bulk 13.75
Ton lots 15.25
Less ton lots 16.15

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.
High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.
Carloads 21.60
Ton lots 23.75
Less ton lots 25.25
Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.
Carloads 27.75
Ton lots 30.05
Less ton lots 31.35

Chromium Metal

Contract prices, per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.
0.20% max. C $1.09
0.50% max. C 1.05
9.00% min. C 1.04

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.
30-33% Ca, 60-65% Si, 3.00% max. Fe.
Carloads 17.90
Ton lots 21.00
Less ton lots 22.50

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.
16-20% Ca, 14-18% Mn, 53-59% Si.
Carloads 19.25
Ton lots 21.55
Less ton lots 22.55

CMSZ

Contract price, cents per pound of alloy, delivered.
Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.
Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.
Ton lots 19.75
Less ton lots 21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis: V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.
Ton lots ..... 15.75¢
Less ton lots ..... 17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.
Carload packed ..... 17.00¢
Ton lots to carload packed ..... 18.00¢
Less ton lots ..... 19.50¢

SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.
Ton lots 17.25
Less ton lots 18.50

Other Ferroalloys

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.
Carload ..... 7.40¢
Ton lots ..... 8.80¢
Calcium molybdate, 45-50%, f.o.b. Langeloth, Pa., per pound contained Mo. ..... 96¢
Ferrocolumbium, 50-60% contract basis, delivered, per pound contained Cb.
Ton lots $2.90
Less ton lots 2.95
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo. $1.10
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton $65.00
10 tons to less carload 75.00
Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti..... $1.25
Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti..... $1.40
Less ton lots 1.45
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, carloads per net ton $160.00
Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered $2.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained, V.
Openhearth $2.90
Crucible 3.00
High speed steel (Primos) ... 3.10
Molybdenum oxide briquets, f.o.b. Langeloth, Pa.; bags, f.o.b. Wash., Pa., per lb contained Mo. 95¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
Carload, bulk, lump ..... 11.00¢
Ton lots, bulk, lump ..... 11.50¢
Ton lots, packed, lump ..... 11.75¢
Less ton lots, lump ..... 12.25¢
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.20
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
Ton lots ..... 21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.
Carload, bulk ..... 6.60¢

Boron Agents

Contract prices, per lb of alloy, del.
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B $4.25
Bortam, f.o.b. Niagara Falls
Ton lots, per pound ..... 45¢
Less ton lots, per pound ..... 50¢
Carbortam, f.o.b. Suspension Bridge, N. Y.; freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.
Ton lots, per pound ..... 8.625¢
Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots $1.20
F.o.b. Wash., Pa.; 100 lb and over
10 to 14% B. ..... .75
14 to 19% B. 1.20
19% min. B. 1.50
Grainal, f.o.b. Bridgeville, Pa. freight allowed, 100 lb and over.
No. 1 ..... 93¢
No. 6 ..... 63¢
No. 79 ..... 45¢
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.
Ton lots $1.67
Less ton lots 1.79
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.
Less ton lots $1.80
Silcaz, contract basis, delivered
Ton lots ..... 45.00¢

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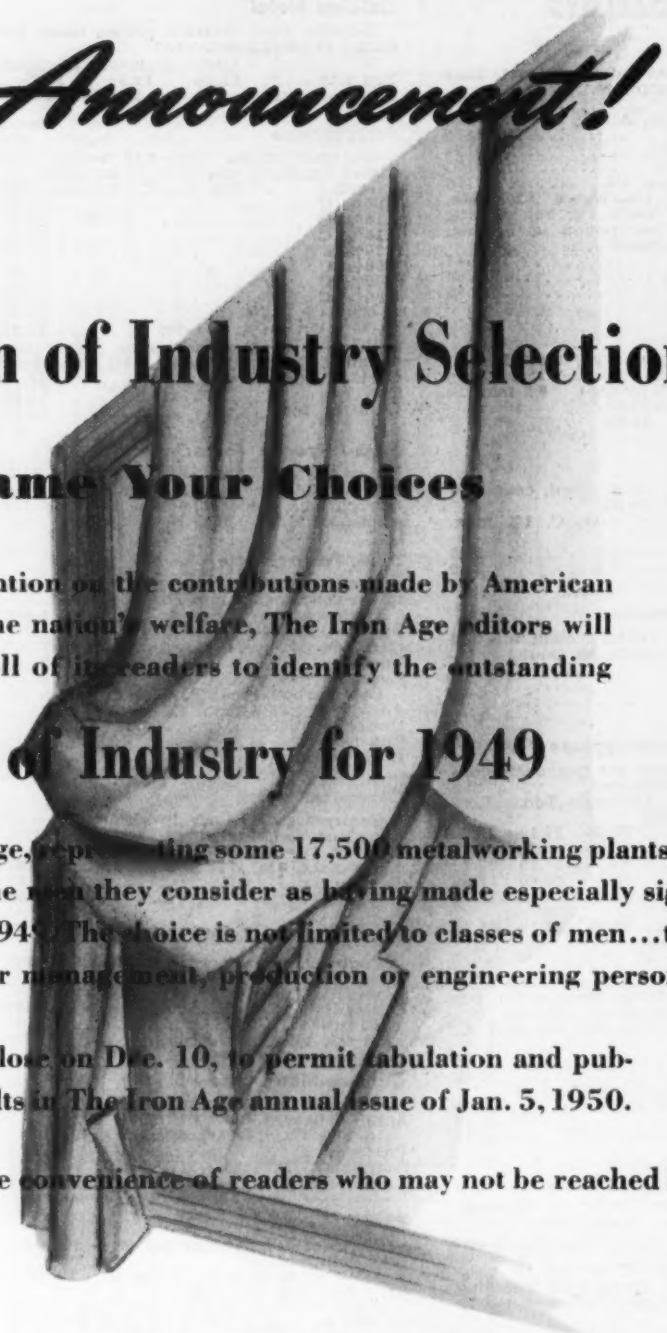
An Announcement!



First Men of Industry Selection

Name Your Choices

To focus attention on the contributions made by American industry to the nation's welfare, The Iron Age editors will conduct a poll of its readers to identify the outstanding

Men of Industry for 1949

Readers of The Iron Age, representing some 17,500 metalworking plants, will be asked to indicate the men they consider as having made especially significant contributions in 1949. The choice is not limited to classes of men... those selected may be either management, production or engineering personnel.

Balloting will close on Dec. 10, to permit tabulation and publication of results in The Iron Age annual issue of Jan. 5, 1950.

The ballot below is for the convenience of readers who may not be reached by mail.

Men of Industry Poll
Iron Age
100 East 42nd Street
New York 17, N.Y.

*MY NOMINATIONS FOR IRON AGE'S OUTSTANDING MEN OF THE METAL INDUSTRY ARE:

(PLEASE PRINT)

Name_____	Name_____
Title_____	Title_____
Company_____	Company_____
City_____ State_____	City_____ State_____

*give full name and company affiliation

Signed_____

Company_____

Iron Age Introduces

Continued from Page 24

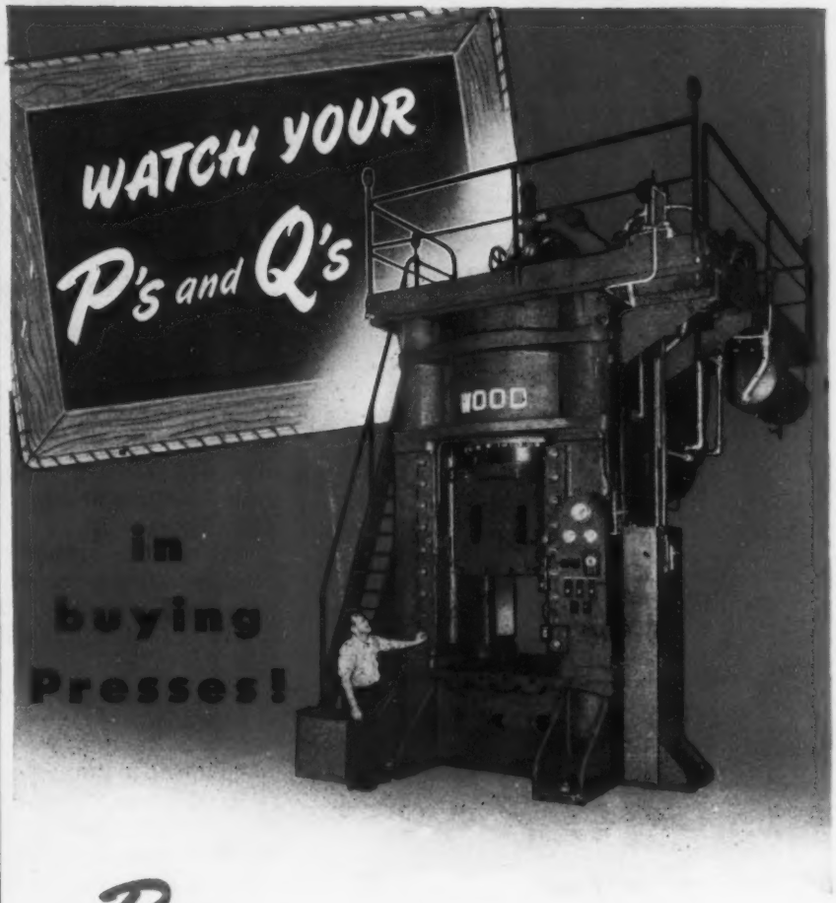
Robert P. Neuschel has been named a consultant in manufacturing for McKINSEY & CO., New York. An industrial engineer, Mr. Neuschel has been with Sylvania Electric Products, Inc., Salem, Mass., prior to his association with the company. **Robert Jerrett, Jr.**, has been named market consultant and **Thomas C. Palmer** retailing consultant. Mr. Jerrett was previously assistant to the president of Wiggins Airways, Inc.

RAYMOND J. SCHILLUM, member of the board of directors and vice-president in charge of sales of the Brown-Hutchinson Iron Works.

Raymond J. Shillum has been elected a member of the board of directors and vice-president in charge of sales of the BROWN-HUTCHINSON IRON WORKS, Detroit. Mr. Shillum was sales manager of the alloy sales division and has been with the company for 2 years. He was formerly with the metallurgical and heat treating division of the Ford Motor Co. for 25 years.

J. H. James has been appointed assistant vice-president of the PITTSBURGH & LAKE ERIE RAILROAD CO., and the LAKE ERIE & EASTERN RAILROAD CO. **Frank L. Foster** has been named assistant general manager. Mr. James joined P. & L. E. in 1906. Mr. Foster was formerly superintendent and is succeeded in that position by **W. T. Elmes.**

Turn to Page 148



POWER:

You want a press with sufficient power—in construction and in doing a job—to give you trouble-free production on a variety of operations. Take the R. D. Wood 2000-ton Hydraulic Forming Press shown, for example. It's a powerful, heavy-duty, automatic, self-contained press used for forming, hot forging, coining and forcing. Designed in capacities from 100 to 5000 tons, it has the power you need in *your* plant.

QUANTITY:

You want a press that can turn out the quantity of work necessary in the modern-day plant—efficiently and with a minimum of maintenance. R. D. Wood Hydraulic Presses have the design features, the materials, and the workmanship required for quantity production at low cost. Write for literature today on hydraulic presses or hydraulic press problems. R. D. WOOD COMPANY, Public Ledger Building, Philadelphia 5, Pa.

HYDRAULIC PRESSES AND VALVES FOR ... • ACCUMULATORS • ... • INTENSIFIERS

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NEARLY 600,000 PIECES—

...a new production record made possible by higher press operating speeds

Deep drawing heavy gage coil stock at high speeds on progressive dies is a real test for a press. In this operation, like the one shown, a Danly Autofeed is achieving shift production running close to 4000 units in spite of time required for restocking and die changing.

And in the matter of die life, this production average speaks for itself. Precision closure and extra rigidity built into this Danly Autofeed assure longer runs before die sharpening is required.

DIE LIFE IMPROVED. In this application, the higher operating speed made possible by Danly Press construction features resulted in an important increase in the number of pieces produced per die.

Danly Presses Run Longer

Records like this are made possible by exclusive mechanical features found only in Danly Presses. First, there is the new Danly cool-running clutch, designed to outwear conventional press clutches because less destructive heat is generated. And a special forced air cooling system keeps the clutch operating temperature only 35° above room temperature. Other advantages include positive pressure lubrication throughout and sensitive control reaction to facilitate die try outs.

CHECK THESE
EXCLUSIVE DANLY PRESS FEATURES

- ✓ cool-running clutch
- ✓ extra rigidity
- ✓ complete pressure lubrication
- ✓ special controls—sensitive reaction
- ✓ precision construction

SEND FOR THIS FREE BOOKLET...
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MECHANICAL PRESSES...50 TO 3000 TONS

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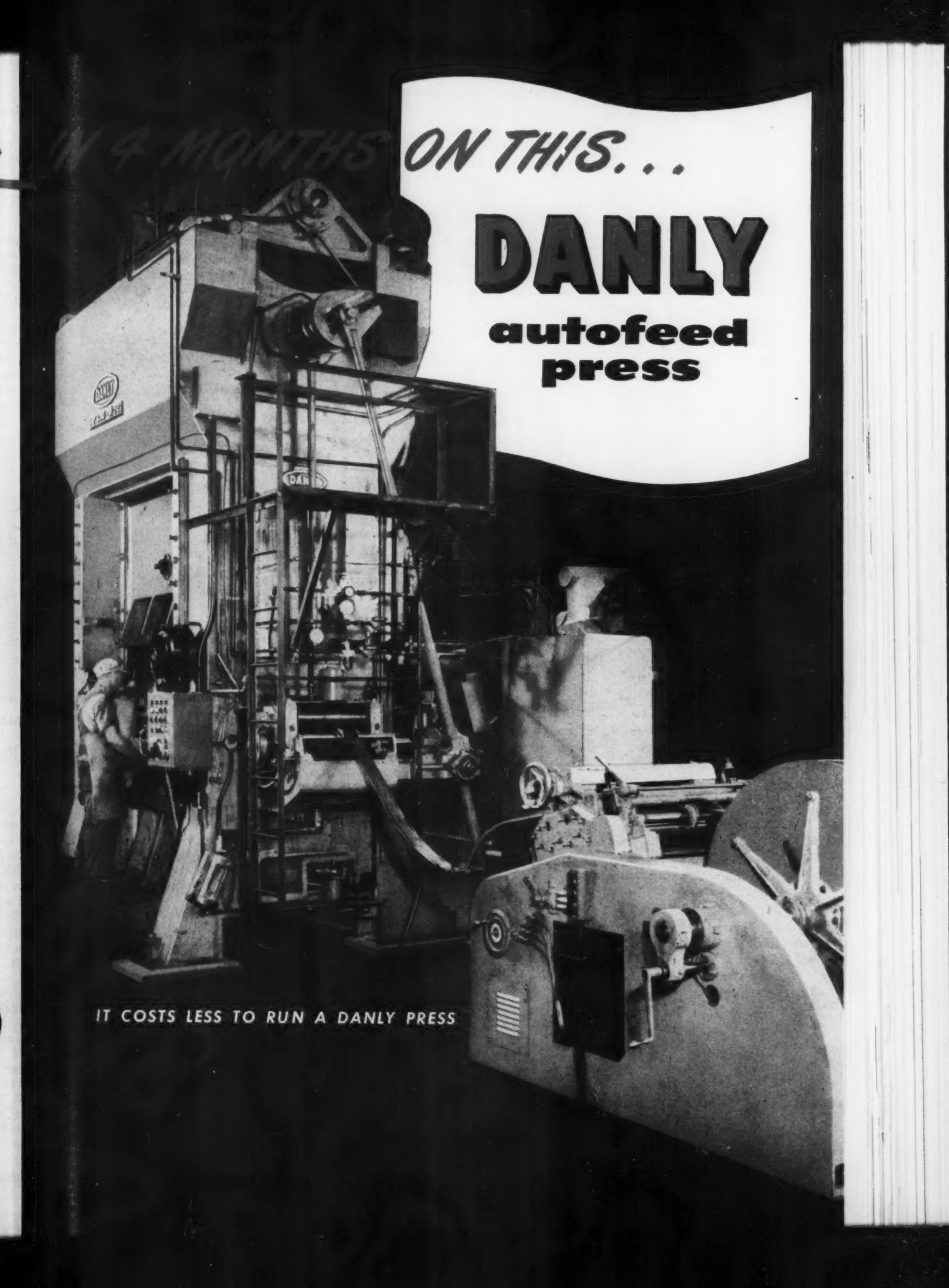
ON THIS...
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IT COSTS LESS TO RUN A DANLY PRESS

"King Tut tomb" ovens—installed in 1916 and still used successfully for long-cycle annealing of heavy castings.
BLAZING THE HEAT TREAT TRAIL
The first continuous controlled-atmosphere furnace heated by radiant tubes—producing economically at International Harvester Co. since 1936.
Three of six automatic overhead type controlled-atmosphere furnaces recently installed at International Harvester Co., Chicago.

Since 1916— *Holcroft*

means **ECONOMY** in

MALLEABLE ANNEALING

From the tomb-type ovens of 1916 to the latest high-production units, Holcroft furnace engineering has led the way to new economies in malleable annealing. The radiant-tube-heated, controlled-atmosphere furnace—introduced by Holcroft in 1936—replaced heavy work containers with light-weight trays, giving notable savings in time and fuel. The Holcroft overhead furnace design cut time and labor to a new low; and we can cite many other advantages provided by Holcroft trail-blazing.

Holcroft furnace design is based on *complete metallurgical and engineering service*. We design each furnace for its individual application, selecting *without bias* the elements best suited to the job; and in so doing, we constantly develop improved features and processes. As a result, Holcroft furnaces meet every production requirement *at minimum over-all cost*—for malleable annealing and for *every other* heat treating process.

For these reasons, it will pay you to have us quote on your next heat treating installation. We cordially invite your inquiries.

SINCE 1916 *Holcroft* AND COMPANY

BUILT BY HOLCROFT & COMPANY DETROIT-MICH.

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IRON AGE INTRODUCES

Continued from Page 145

Walter Eichorn has been named New England district sales manager and **W. H. Smith** was appointed divisional sales manager of the Philadelphia, Maryland, Virginia and Washington area for STEMCO CORP., Cleveland. **W. T. Heintz** has been named sales representative to cover the communications industry throughout the nation for the Cleveland firm.

ROBERT E. HUNTER, director of sales, General Motors Diesel, Ltd., whose appointment was reported in THE IRON AGE last week.

OBITUARIES

Walter S. Rearick, 52, vice-president and works manager, Aluminum Cooking Utensil Co., New Kensington, Pa., died Nov. 12.

Ernest Richardson, retired president and co-founder, Ingram-Richardson Mfg. Co., Beaver Falls, Pa., died Nov. 11.

Daniel B. DeLand, 64, assistant to vice-president in charge of manufacture, American Can Co., New York, died Nov. 4.

Philip S. Cottier, purchasing agent, Pittsburgh Steamship Co., died Nov. 15.

Benjamin R. Kennedy, 48, personnel manager, Lawson Machine & Tool Co., Malden, Mass., died Nov. 11.

Earl F. Reinhart, president, Republic International Co., New York, died recently.

Resume your reading on Page 25

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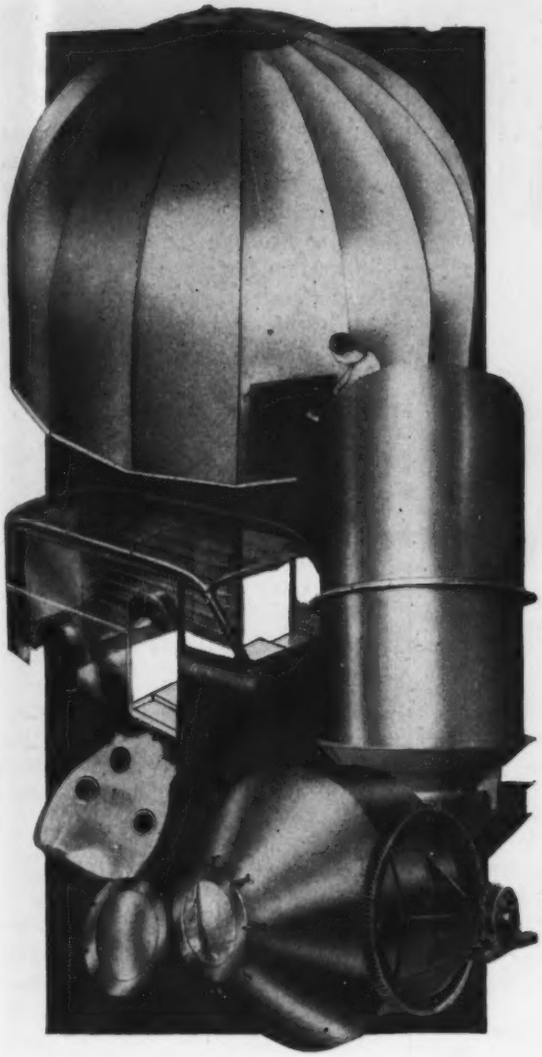


When it's gotta fit . . .
Brandt measures up!

"STAMPED BY BRANDT"

. . . Your best "buy-words" for mass production of stampings to meet nation wide assembly line schedules.

SAVES TIME AND DOLLARS

With Brandt's complete, versatile organization of skilled workmen and experienced engineers.

STEPS UP YOUR ASSEMBLY

Several hundred thousand square feet of streamlined production equipment, strategically located for high speed, mass production to all parts of the country.

WRITE BRANDT TODAY

Send part, sample or drawing. Your inquiry will be promptly expedited.

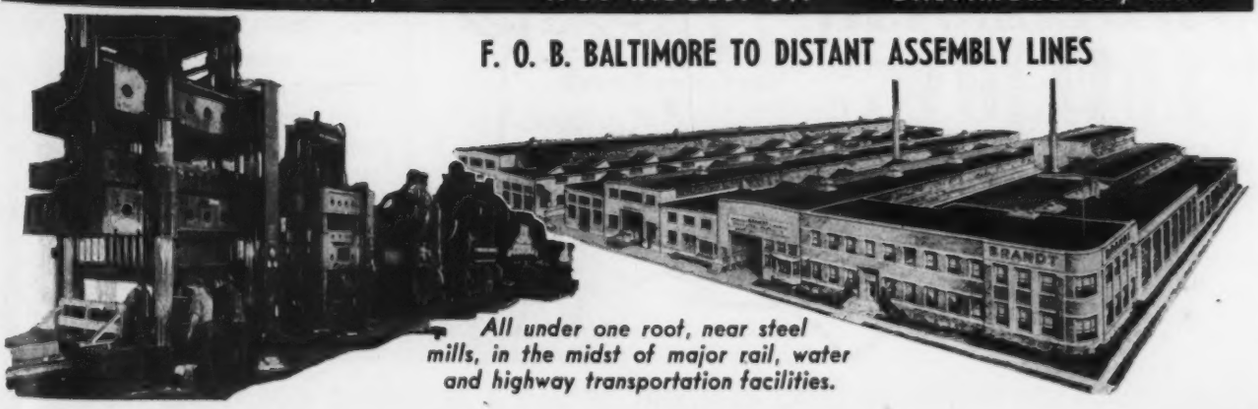
Extensive Plant Facilities
Exacting Specifications Met
Rigid Inspection System
Precision Workmanship
On-the-dot Deliveries
Wide Range of Facilities

BRANDT
BALTIMORE

METAL STAMPINGS—HEAVY WELDMENTS—PRESSED STEEL SHAPES

CHARLES T. BRANDT, INC. 1700 RIDGELY ST. BALTIMORE 30, MD.

F. O. B. BALTIMORE TO DISTANT ASSEMBLY LINES



All under one roof, near steel mills, in the midst of major rail, water and highway transportation facilities.

OVER ONE HUNDRED YEARS OF CONTINUOUS SERVICE ROUNDS, SQUARES, FLATS, HEXAGONS, OCTAGONS, BILLETS AND FORGINGS FOR PRODUCTION, TOOL ROOM AND MAINTENANCE REQUIREMENTS.

THE ALLOY STEEL THAT'S *MEANT FOR PUNISHMENT*

"M" TEMPER oil hardening steel was developed specifically for such vital, punishment-taking parts as dies, cams, collets, forming rolls, clutches, gears, etc. "M" TEMPER effectively combines high hardness with maximum toughness, minimum distortion, extreme density and great strength – properties that ideally combine to resist wear and breakage. This grade develops the advantages of the powerful alloys – chromium, nickel and molybdenum. Moreover, "M" TEMPER has excellent forging properties and is readily machinable in the annealed condition. Although low in cost, "M" TEMPER has non-deforming properties comparable to, and in many cases superior to, much more expensive steels.

WL *steels are metallurgically constant. This guarantees uniformity of chemistry, grain size, hardenability—thus eliminating costly changes in heat treating specifications.*

Write today for your FREE COPY of the Wheelock, Lovejoy Data Book. It contains complete technical information on grades, applications, physical properties, tests, heat treating, etc.

WHEELOCK, LOVEJOY & CO., INC.
126 Sidney St., Cambridge 39, Mass.

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HY-TEN and AISI

Aluminum Grain Bins Help Solve Needed Storage Capacity

Oakland, Calif.—Aluminum was a major factor in preventing loss and wastage of the nation's big 1949 harvest by providing vitally needed storage for approximately 83,000,000 bu of grain, according to estimates prepared by Kaiser Aluminum & Chemical Sales, Inc.

Tabulation of contract awards shows that the Commodity Credit Corp. placed orders with fabricators for nearly 26,000 aluminum grain bins, nearly all with a capacity of about 3250 bu each. The Butler Mfg. Co. of Kansas City did about two-thirds of the fabrication of these circular bins. The Beatrice Steel Tank Co. of Beatrice, Nebr., also made similar bins.

Aluminum producers stepped up production rates to produce the needed 25,000,000 lb of aluminum in time to meet the harvest deadline.

Building Volume Gains Hold

New York—The building upswing which started in August held its momentum in October, according to an analysis by F. W. Dodge Corp.

Contracts awarded during October in the 37 states east of the Rocky Mountains totaled $1,061,751,000, the third highest monthly volume in the Dodge statistical series dating back to preboom days of the twenties.

The only other months showing a higher volume were June 1942 when construction for war purposes was at a peak, the total then being $1,190,264,000, and September of this year, when the total was $1,093,724,000.

Last month's building and engineering contract volume was off 3 pct from September's record, but was up 36 pct over October of last year.

Investment commitments last month brought the cumulative total for this year in the 37 states to $8,472,459,000 or 4 pct higher than in the corresponding 10 months of last year.

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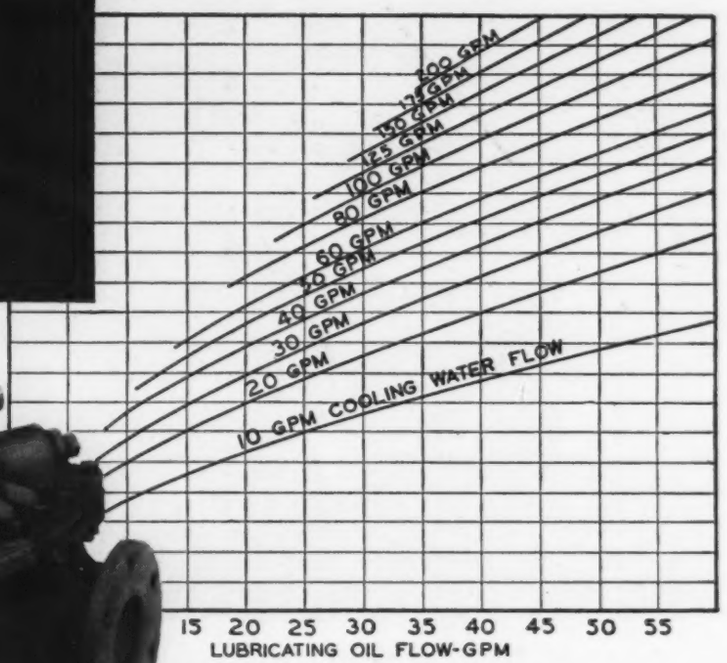
HARRISON OIL COOLERS



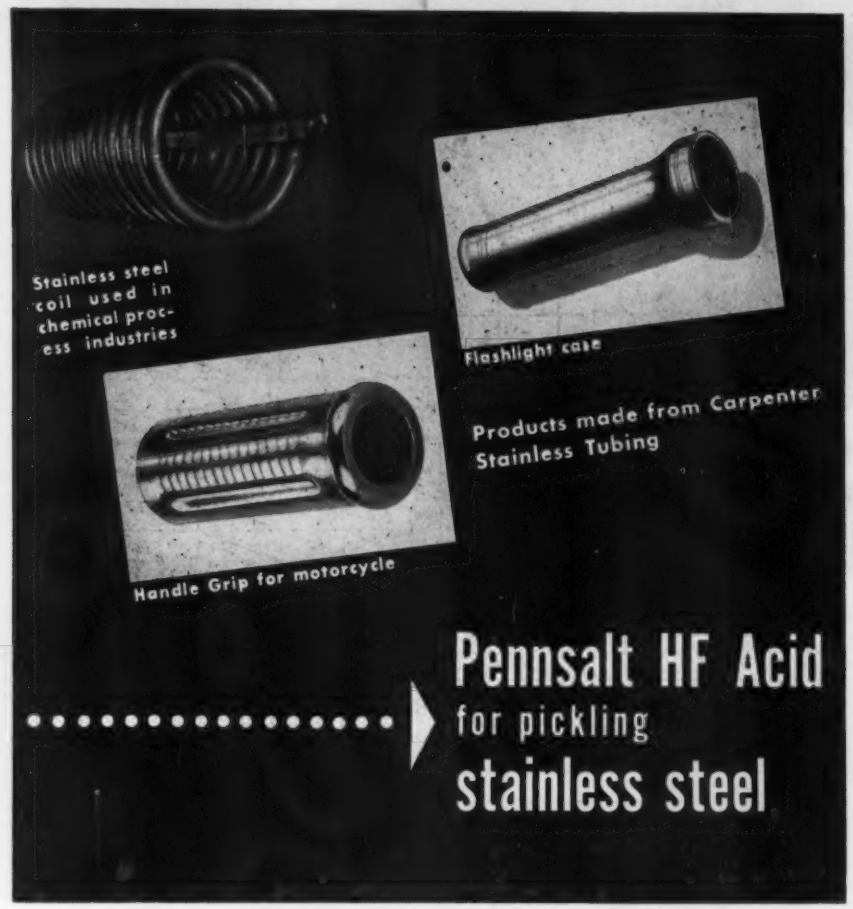
CUT COSTS WITH

Controlled Cooling

Make machine tools more efficient. Let Harrison analyze your cooling problem on cutting oil, lube oil, hydraulic fluid. Complete testing laboratories assure the *right* Harrison product to meet your needs.

HARRISON

HARRISON RADIATOR DIVISION, GENERAL MOTORS CORPORATION, LOCKPORT, N. Y.



Alloy Tube Division, The Carpenter Steel Company, is just one of the many manufacturers of stainless steel products that use the HF-HNO_3 pickling process. And for their HF, they look to Pennsalt. That's because Pennsalt HF acid fulfills exacting requirements!

Check these features of Pennsalt HF Acid for stainless steel pickling:

- **removes scale due to heat treating**
- **gives good finish**
- **economical**
- **easy to use**
- **uniform**

Pennsalt, for almost 100 years a *basic* producer of chemicals, delivers hydrofluoric acid to you at a fair price. That's because Pennsalt builds chemicals from the ground up. To help you with your pickling problems, Pennsalt maintains engineering service available to you at no cost or obligation. Check into Pennsalt products for use in your operation, write: Heavy Chemicals Division, Pennsylvania Salt Mfg. Co., Philadelphia 7, Penna.

PENN SALT chemicals

Pennsalt Anhydrous HF
- Effective catalyst
- Condensation reagent

Pennsalt Metal Cleaners
Corrosion-Resistant Cements and Paints

FREE

PUBLICATIONS

Continued from Page 34

specification-selection charts are included. *Precision Steel Warehouse Inc. For more information, check No.* 13 *on the postcard on p.* 35.

Collapsible Pallets

The Fab-Well line of collapsible pallet boxes is described in 4-p. photo-folder. *Fab-Well Corp. For more information, check No.* 14 *on the postcard on p.* 35.

Industrial Cranes

Illustrations, descriptions, and outline dimensions of Shaw-Box type S overhead traveling cranes appear in 16-p. color catalog. *Manning, Maxwell & Moore, Inc. For more information, check No.* 15 *on the postcard on p.* 35.

Flaring Tool

Form-a-Gage, a new flaring tool for tubing, is described and illustrated in 4-p. pamphlet. *Penn Brass & Copper Co. For more information, check No.* 16 *on the postcard on p.* 35.

Stainless Wire Ropes

Stainless steel and monel metal wire ropes are described and listed in 4-p. color pamphlet, with 133 different sizes and types catalogued. *Macwhyte Co. For more information, check No.* 17 *on the postcard on p.* 35.

Pipe Tools

The line of Rigid pipe tools such as wrenches, threaders, cutters, vises, extractors, reamers, and portable power drives are featured in 3-color, 16-p. catalog. *Ridge Tool Co. For more information, check No.* 18 *on the postcard on p.* 35.

Grinding Attachment

A new Moore grinding attachment for use on surface grinders, jig borers, jig grinders, drill presses, and light milling machines is

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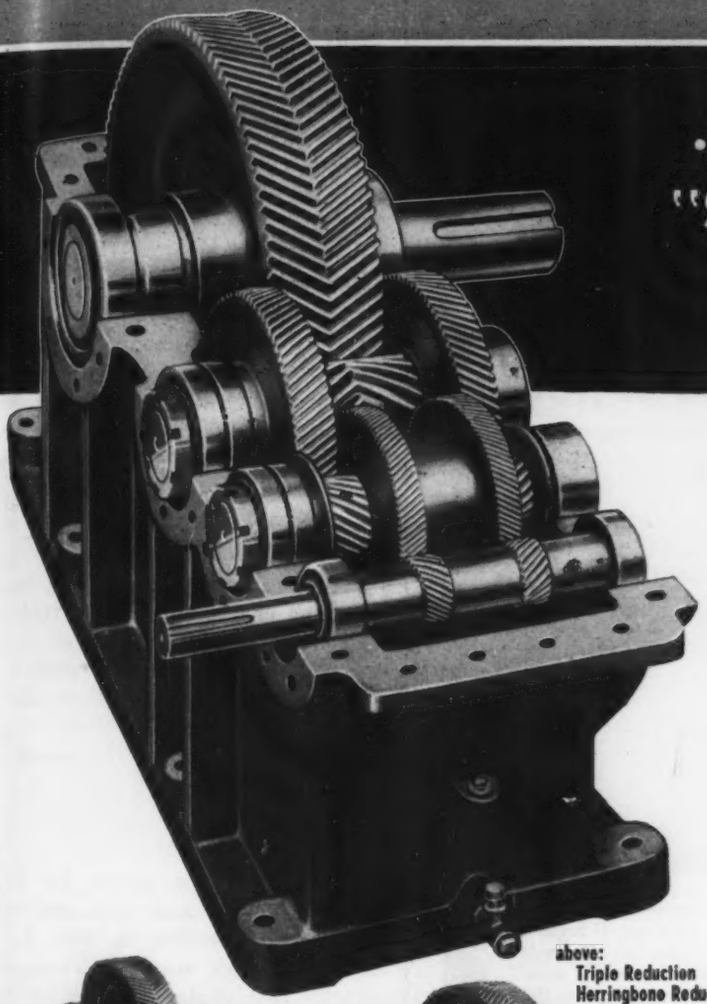
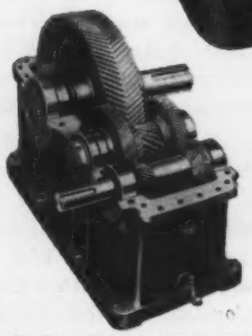
THIS GEAR ARRANGEMENT
GIVES PERFECT BALANCE & SYMMETRY

. . and Bearings "Share the Load" *Equally*



above:
Triple Reduction
Herringbone Reducer



Double Reduction Herringbone Reducer

Single Reduction Herringbone Reducer

. . another feature of

Philadelphia HERRINGBONE Speed Reducers

• Just one of the well planned construction features of these widely used Reducers, is the "Gear Arrangement" in the Double and Triple Reduction Type . . . the gears are located symmetrically in relation to the centerline of the housing, rather than the usual offset arrangement. It will be noted that 2 standard bearings are used on each shaft and *each bearing absorbs an equal load.* (In comparison to the offset arrangement of Herringbone Gears, which result in unequal bearing loads, while similar arrangement of single helical gears impose an additional load by the thrust action) . . . It is evident then, that Philadelphia Herringbone Reducers with double helical gears spaced equidistant from the bearings in the first and intermediate reductions, with a continuous tooth herringbone gear set on the centerline for final reduction, *provide perfect balance and symmetry.*

For complete construction details, get our Catalog H-49. Please write on your Business Letterhead.

Philadelphia Gear Works, INC.

ERIE AVE. AND G ST., PHILADELPHIA 34, PA.

NEW YORK • PITTSBURGH • CHICAGO • HOUSTON

IN CANADA: WILLIAM AND J. G. GREEY LIMITED, TORONTO

Industrial Gears and Speed Reducers
LimiTorque Valve Controls

Kinnear Rolling Doors

... as fundamental in principle as the wheel

Like the smooth, rolling action of the wheel, the coiling upward action of Kinnear Rolling Doors involves a basis principle of highest operating efficiency. You can change the wheel's "face" in hundreds of ways, but you can't find a better way to do its job. By the same token, the basic advantages of Kinnear Rolling Doors give you the best answer to door needs.

Kinnear's rugged curtain of interlocking metal slats opens straight upward. It coils compactly out of the way above the opening. Floor, wall and even ceiling space remain fully usable at all times. The door clears the opening from jamb to jamb, and from floor to lintel, completely out of traffic's way. When open, it is safe from damage by wind or vehicles. When closed, it presents an all-metal barrier that assures extra protection against storms, intruders, or fire.

In addition, Kinnear Rolling Doors provide smooth, easy operation under all conditions. They may be controlled manually, mechanically (by chain or crank) or electrically. Motor operated doors can be equipped with any number of remote control switches, for highest convenience. Kinnear Rolling Doors are built of various metals, in any size, for easy installation in old or new buildings. Let us send you complete information.

The KINNEAR Manufacturing Co.

1760-80 Fields Ave.
Columbus 16, Ohio

Saving Ways in Doorways
KINNEAR
ROLLING DOORS

1742 Yosemite Ave.
San Francisco 24, Calif.

Offices and Agents in All Principal Cities

FREE PUBLICATIONS

Continued

described in 4-p. photo-illustrated catalog. *Moore Special Tool Co., Inc. For more information, check No. 19 on the postcard on p. 35.*

Self Dumping Hopper

The Roura self-dumping hopper, a labor saving materials handling tool, is described in 4-p. catalog. *Roura Iron Works, Inc. For more information, check No. 20 on the postcard on p. 35.*

Spring Tester

The Baldwin-Hunter spring tester for tension and compression springs is described in 4-p. pamphlet through use of photos and details. *Baldwin Locomotive Works. For more information, check No. 21 on the postcard on p. 35.*

Pipes and Tubes

Specifications, descriptions, and selection charts of pipe and tubing is contained in 40-p. catalog. Also included are hand and hydraulic bending machines. *Wallace Supplies Mfg. Co. For more information, check No. 22 on the postcard on p. 35.*

Iron Valves

R-S heavy iron valves for hydraulic service, and their applications, are described in 10-p. brochure through use of drawings, charts, and photos. *R-S Products Corp. For more information, check No. 23 on the postcard on p. 35.*

Magnetic Relays

Seven standard types of magnetic relays for industrial control applications are listed in 12-p. catalog. *Ward Leonard Electric Co. For more information, check No. 24 on the postcard on p. 35.*

Hydraulic Presses

Bulletin 749 describes 100, 150, and 200-ton capacity hydraulic presses for drawing, forming, straightening, bending and coining. *Lake Erie Engineering Corp. For more information, check No. 25 on the postcard on p. 35.*

Resume Your Reading on Page 35

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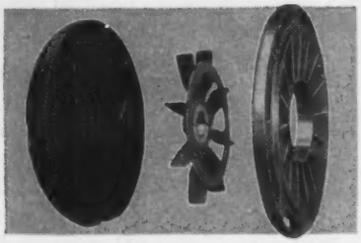
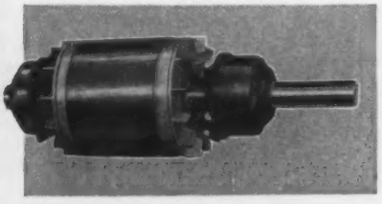
Wagner
Totally-Enclosed Fan-Cooled Motors
Built for your Protection

here's the Inside Story!



Fan shield, which protects externally mounted, non-ferrous ventilating fan; and front endplate, ribbed for mechanical strength.

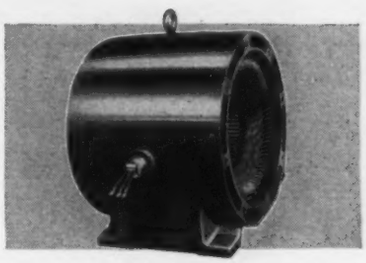


Cast aluminum rotor with cartridge-type ball bearings.

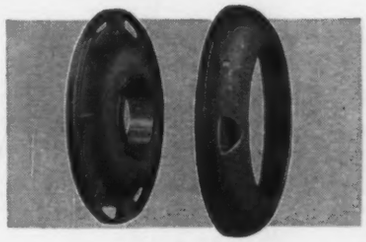
Wagner totally-enclosed, fan-cooled motors are designed for a particular purpose—to operate efficiently and safely in atmospheres filled with dust, fumes, moisture, explosive gases and combustible substances. These motors are approved by Underwriters' Laboratories for Class I Group D and Class II Groups E, F, and G hazardous locations. The photographs indicate the painstaking care with which these motors are built for your protection. They are available in ratings up to 200 horsepower, and are varied electrically to suit a wide variety of application requirements. Bulletin MU-185 gives information on the complete line of Wagner Motors.

BUYERS OF WAGNER MOTORS GET NATIONWIDE SERVICE! More than 450 Wagner Authorized Electrical Service Stations and Parts Distributors augmented by 25 Wagner-owned Service Branches are ready to immediately supply on-the-spot service, factory guaranteed exchange motors, or genuine Wagner parts. Write for Bulletin MU-24 for complete list.

Wagner Electric Corporation
6403 Plymouth Ave., St. Louis 14, Mo., U. S. A.



Wound stator, showing extra large air ducts.

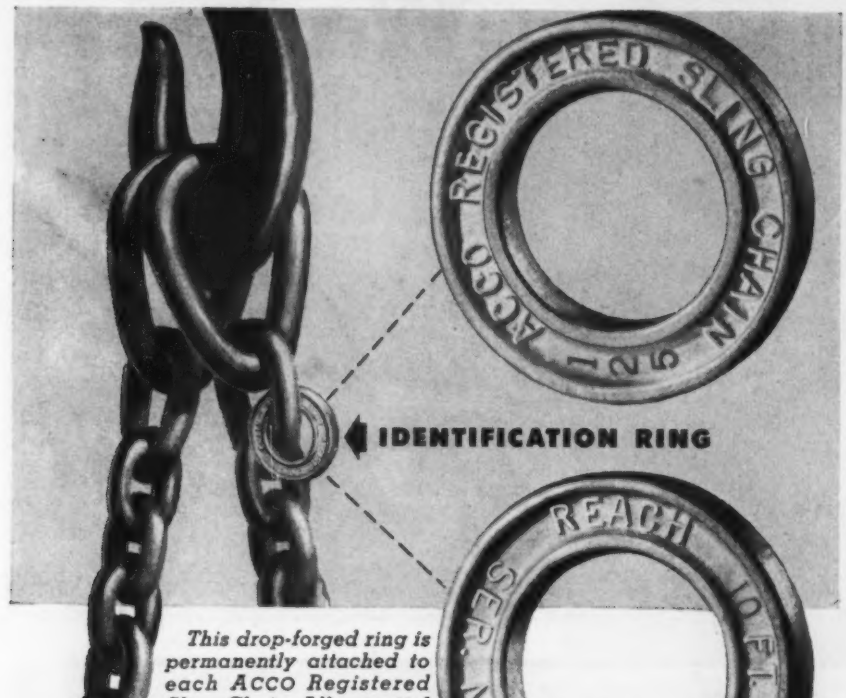


Back endplate, and shield which directs ventilating air so that it cools the drive-end bearing.

Consult Wagner Engineers on all Electric Motor Problems

Wagner Electric Corporation
EST. WE 1891

BRIDGE BRAKES • POWER AND DISTRIBUTION TRANSFORMERS • MOTORS • UNIT SUBSTATIONS
ELECTRICAL EQUIPMENT AND AUTOMOTIVE BRAKE PRODUCTS



This drop-forged ring is permanently attached to each ACCO Registered Sling Chain. All essential identifying information shown on both sides of Ring, as illustrated, protected by outer flange.

Certified

BY AMERICAN CHAIN

"The Nation's Chainmaker"

We believe that the best way to build safety into Sling Chains is to make each one individually—to inspect it and test it as though it were made to special order.

From that belief came the idea of ACCO Registered Sling Chains. Each sling chain made by AMERICAN CHAIN is Registered. Each one carries a Certificate of Test and Warranty. Every one is identified by a permanent metal ring on which is stamped all essential identifying information.

SEND for this catalog which contains information on how to select, use and care for sling chains. It is DH-80.

ACCO

York, Pa., Chicago, Beaver, Detroit, Pittsburgh, Portland, San Francisco, Los Angeles, New York, Philadelphia Bridgeport, Conn.

AMERICAN CHAIN DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

In Business for Your Safety

NEW

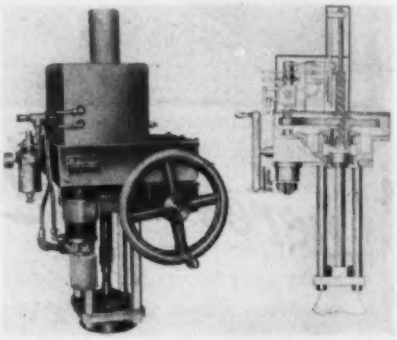
PRODUCTION IDEAS

Continued from Page 38

lead and babbitt. *Sunnen Products Co. For more information, check No. 41 on the postcard on p. 35.*

Power Operator

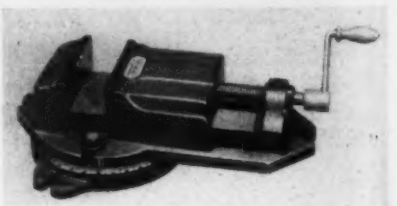
A reversible pneumatic motor and gear driven screw stem are features of the Rotomotor, a pneumatic



power operator for valves, dampers and other control devices. It combines the features of a self-locking stem, simple, continuously connected handwheel, extreme sensitivity, and compact size. *Conoflow Corp. For more information, check No. 42 on the postcard on p. 35.*

Machinists' Vise

An improved Low-Boy machinists' vise is low and compact, providing extra clearance between table and cutting tool. A lock-plate



for the swivel permits a locking area of 360°, clamps the vise more rigidly, with less pressure and eliminates time previously required to work T bolts around in chip-filled slots. The Low-Boy is precision made with hardened and ground steel jaws. Two models are available: one is 5 in. high with jaw

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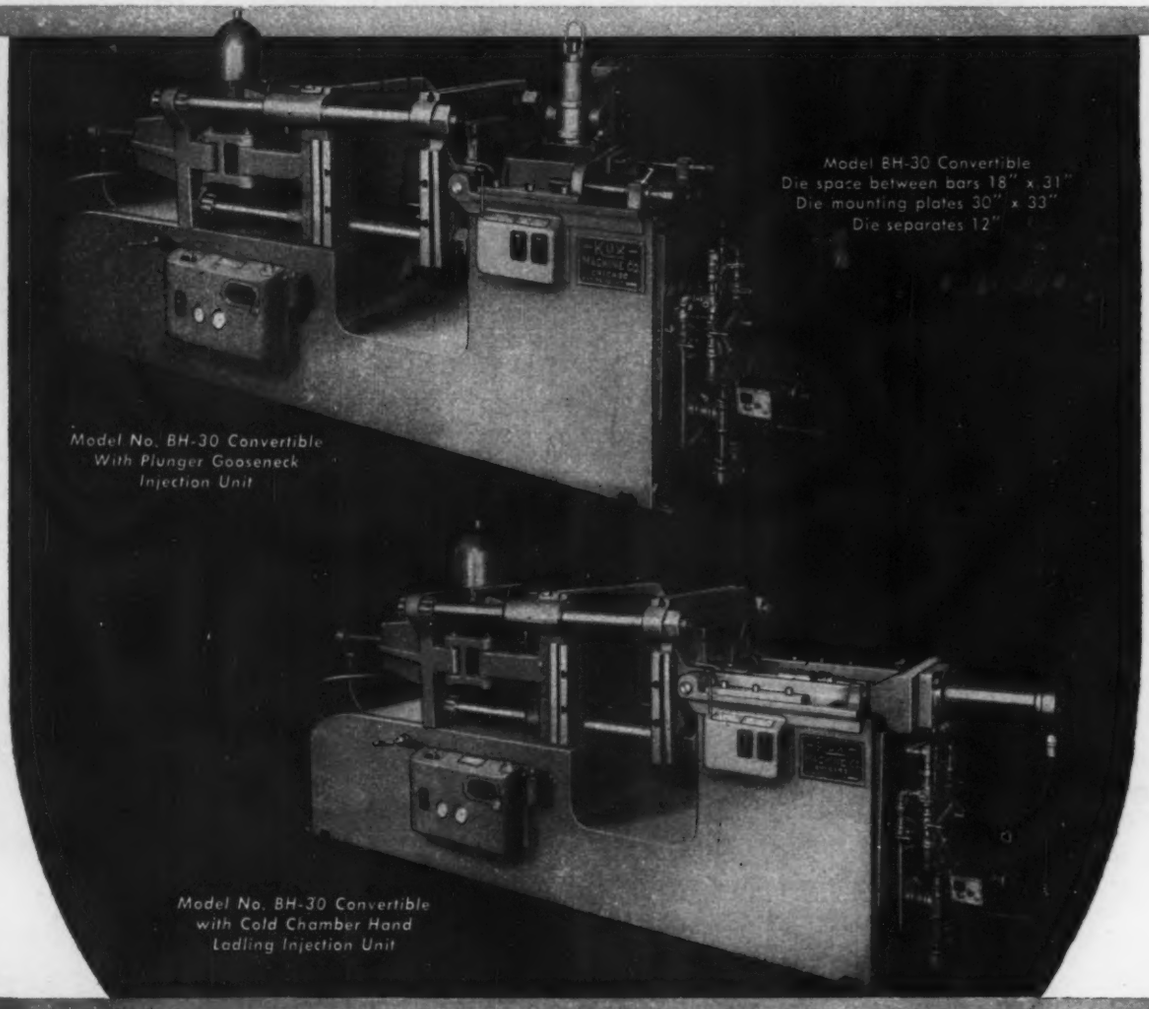
CONVERSION FROM ZINC TO ALUMINUM DIE CASTING

in less than an hour on

KUX CONVERTIBLE MACHINES

In less than an hour's time, Kux hydraulic machines can be adjusted for die casting zinc alloys using a plunger gooseneck metal injection unit or for die casting aluminum brass or magnesium alloys using a cold chamber hand ladling injection unit.

This change over is a simple easy operation on any of the Kux machines from Model BH-18 to Model BH-30 which are available as convertibles. The removal of a few mounting screws and pins and the attachment of either injection unit, both completely self-contained, rapidly readies a machine for production. Only on Kux Die Casting equipment can you find so many superior design features that offer such a multiplicity of usage for each machine. Write now for illustrated catalog.



Model BH-30 Convertible
Die space between bars 18" x 31"
Die mounting plates 30" x 33"
Die separates 12"

Model No. BH-30 Convertible With Plunger Gooseneck Injection Unit

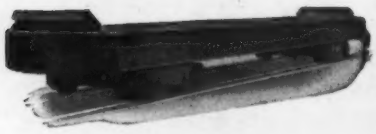
Model No. BH-30 Convertible with Cold Chamber Hand Ladling Injection Unit

KUX MACHINE COMPANY
3938 W. HARRISON STREET • CHICAGO 24, ILLINOIS

ATLAS

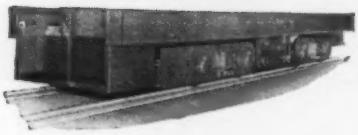
STRIP HANDLING EQUIPMENT

● Strip steel can be handled very economically on rail cars as compared with other means of conveyance. Strip cars can be handled by heavy-duty rubber tired tractors or by locomotives running on the track rails, or they can be self-propelled motor-driven with power supplied by storage battery in the car.



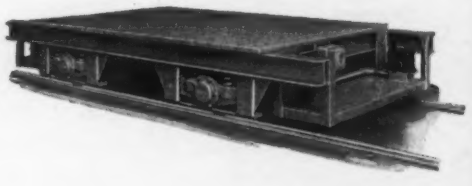
125-Ton DOUBLE TRUCK CAR
for handling steel strip in rolls. This car is hauled by tractor shown below.

SPECIAL HEAVY-DUTY GAS-ELECTRIC TRACTOR
for hauling 125-Ton Strip Handling Cars. Tractors run on rubber tires.



135-Ton FLAT CAR
Powered by storage battery for handling sheet steel.

25-Ton PLATFORM CAR
Powered by storage battery, operates at slow speed and has operator's platform at each end.



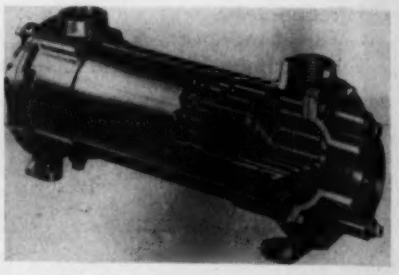
ATLAS ENGINEERING SERVICE
IS ALWAYS AT YOUR SERVICE

THE ATLAS CAR & MFG. CO.
ENGINEERS MANUFACTURERS
1140 IVANHOE RD. CLEVELAND 10, OHIO U.S.A.

height 1 15/16 in., jaw width 5¼ in., jaw opening 4¾ in.; the other is 4 in. high, jaw height 1⅝ in., width 4½ in. and opening 3¼ in. *Parma Mfg. Co. For more information, check No. 43 on the postcard on p. 35.*

Stainless Steel Exchanger

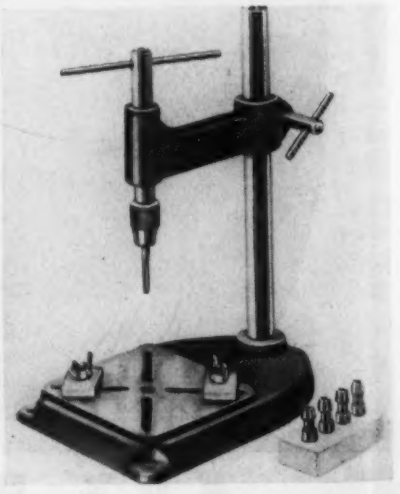
The new model, Type SSCF, heat exchanger is made of type 316 stainless steel to avoid contamination of fluids or corrosion by fluids.



The series incorporates recent advancements in Ross thermal engineering, and is offered in a complete range of sizes tested to 450 psi to withstand most strenuous usage. *Ross Heater & Mfg. Co. Inc. For more information, check No. 44 on the postcard on p. 35.*

Hand Tapper

Right or left hand taps may be used in a new hand tapper that is a bench type machine designed for



sensitive, precision small hole tapping. Four collets that handle standard tap shank sizes and taps from No. 0 to ¼ in. are claimed to provide positive drive-through. A knurled threaded collar holds and

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CYLINDER LINERS:

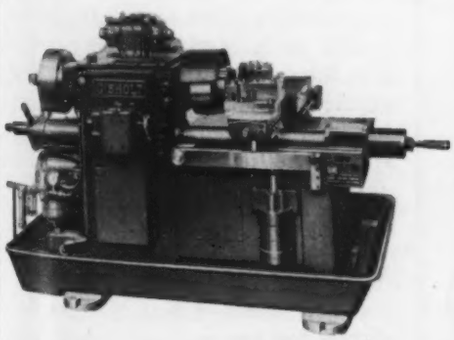
17 different sizes on One Automatic Lathe

THE GISHOLT No. 12 HYDRAULIC

You wouldn't expect an automatic lathe to handle such a wide variety of work as this—unless you know the Gisholt No. 12 Hydraulic.

This versatile automatic lathe handles 17 different sizes of cylinder liners ranging from 6½″ to 13″ in length and from 3″ to 5″ in diameter. The work is chucked on expanding arbors with interchangeable pads, while the front and rear tooling is mounted in standard, interchangeable tool blocks. This arrangement provides exceptional flexibility and a facility to quickly change over from one job to another.

When you can handle as many different sizes of parts on *one* automatic lathe—and cut both machining and set-up time—you're *bound* to cut your costs.



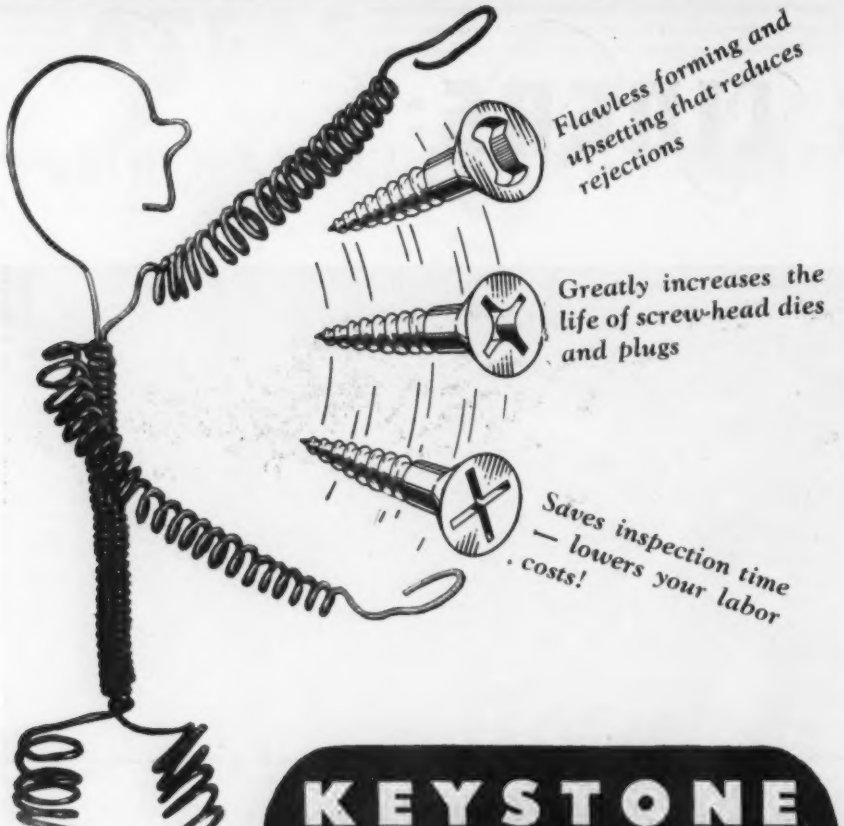
GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

Gisholt No. 12 Hydraulic Automatic Lathe—a rugged 12″ lathe that combines speed and accuracy with easy set-up — unique among automatics.

THE GISHOLT ROUND TABLE *represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.*

GISHOLT

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES


Flawless forming and upsetting that reduces rejections
Greatly increases the life of screw-head dies and plugs
Saves inspection time — lowers your labor costs!

KEYSTONE
"SPECIAL PROCESSED"
COLD HEADING WIRE

For recessed heads, Keystone's new special-process wire delivers the desired upsetting and die forming qualities with such a high degree of uniformity that finished product rejections are practically eliminated . . . individual inspection of screws is no longer necessary . . . die and plug life are often more than doubled. This new wire effects considerable savings in the production of Phillips head, clutch head and cross recessed head screws.

Keystone is prepared to help solve any of your industrial wire problems. If special treatment is called for, Keystone's metallurgical research and testing facilities are available to supply the answers. We welcome your inquiry.

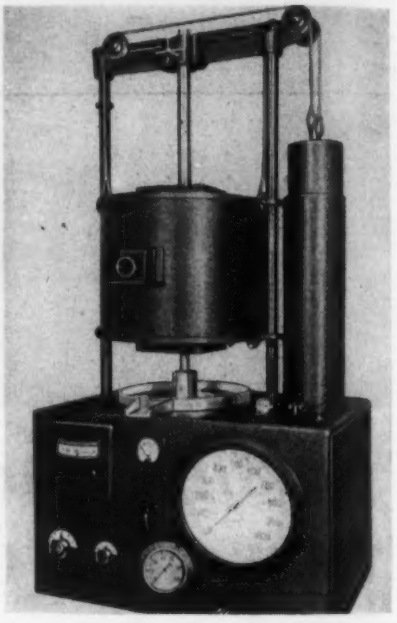
KEYSTONE
STEEL & WIRE CO.
PEORIA . . . ILLINOIS

Special Analysis Wire, Setting New Standards of Performance

centralizes collet and tap. The adjustable spindle arm swings to right or left and is quickly positioned for height. Maximum distance from machine base to bottom of tap is 6 in. The tapper insures accurately tapped right angle holes. *H. D. Herder Tool Specialties Co. For more information, check No. 45 on the postcard on p. 35.*

High Temperature Tester

The No. 785 Thermolab is a complete high temperature testing laboratory for research and control work on molding and refractory materials. Hot strength, collapsibility rate under load, spalling, expansion and contraction can be tested, as well as hot permeability, gas pressure, gas volume, retained strength under various atmospheres and different temperatures ranging up to 2800°F. A load of 0 to 1000 psi can be applied to specimens at a rate of table rise ranging from 0 to 3 ipm. Loading and weighing of the specimens are accomplished by a motor-driven hydraulic system. *Harry W. Dietert Co. For more information, check No. 46 on the postcard on p. 35.*



Magna-Sines

A new series of Magna-Sines designed for use on production type surface grinders has a permanent-

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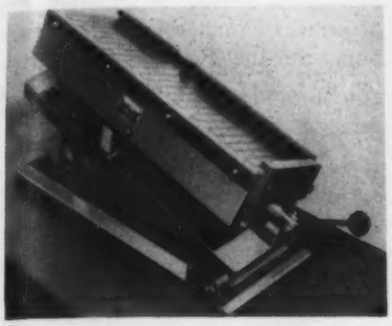
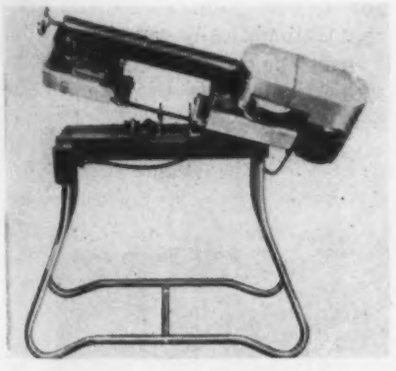
magnet chuck measuring 7½ in. deep x 20½ in. long and can be used for wet or dry grinding. In closed position, the Magna-Sine is used as a conventional magnetic chuck for holding parallel work.



For angular jobs it can be set up with standard gage blocks by the sine bar method. *Omer E. Robbins Co. For more information, check No. 47 on the postcard on p. 35.*

Band Saw

For small shops and general utility work in larger shops a small metal cutting band saw has a capacity of 3½-in. rounds and 3½ x 6⅝ in. rectangular shapes. The ½ x 0.025 in. x 5 ft blade is driven by a 1/6 hp ball bearing motor with manual start and automatic stop. A V-belt drive provides selective speeds of 54, 100 and 190 fpm. The



saw is equipped with a quick action vise and adjustable blade guides. Bed area is 6½ x 24 in. *Wells Mfg. Co. For more information, check No. 48 on the postcard on p. 35.*

Paint Supply Pump

With the new Graco Paintmaster, paint, enamel, lacquer and other finishing materials can be pumped from original containers. This air-operated paint supply pump and agitator delivers a full supply of

FIGURING TOOL COSTS ON PERFORMANCE . . . NOT PRICE, PAYS BIG DIVIDENDS

Productivity—not pennies—is the only way to judge the cost of a tool. No tool deserves a place in your shop unless it can prove . . . on the job . . . that it will enable the machine to operate at peak performance, with minimum downtime.

Kennametal cemented carbide tools are made by processes that are exclusive and expensive, but which are worth far more than the cost . . . because they assure a tool material of consistent soundness.

This Kennametal characteristic pays off—in your shop. In many instances, Kennametal tools will pay for themselves in savings effected in grinding, alone. And this does not take into account reduced tooling costs, and improved production rates attained.

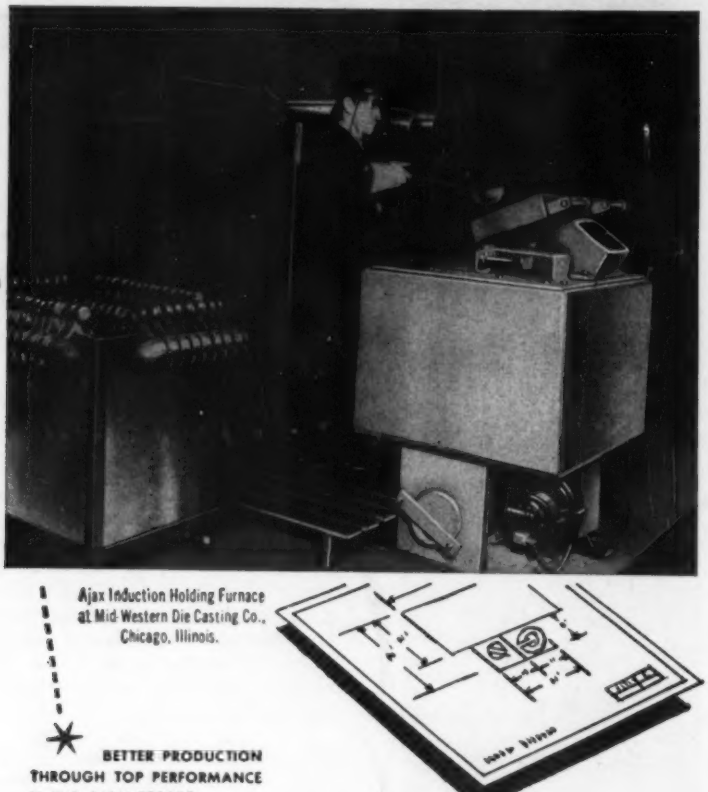
We'll send you, on request, reports that show cost reductions of thousands of dollars on many different operations through the use of Kennametal tooling. But—there is a much better way to demonstrate. That's in your shop, on your job. Ask us to do it.

KENNAMETAL Inc., LATROBE, PA.

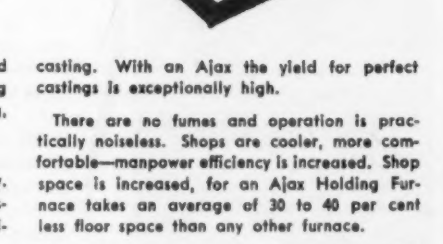
MANUFACTURERS OF SUPERIOR CEMENTED CARBIDES AND CUTTING TOOLS THAT INCREASE PRODUCTIVITY

★ TOP PERFORMANCE WITH AJAX TAMA-WYATT

INDUCTION FURNACES for Aluminum Alloys



Ajax Induction Holding Furnace at Mid-Western Die Casting Co., Chicago, Illinois.



★ BETTER PRODUCTION THROUGH TOP PERFORMANCE IS THE AJAX RECORD

Ajax-Tama-Wyatt induction furnaces are used in the United States and abroad for melting and holding aluminum alloys in die casting, permanent mold, and sand foundries.

No flux or mechanical stirring is necessary. The metal is in constant gentle circulation assuring complete blending of alloys, and a uniform temperature throughout the metal.

Electric energy costs less than fuel and avoids danger of overheating. Completely automatic temperature controls hold metal to within 5° F., at the lowest possible temperature for perfect casting. With an Ajax the yield for perfect castings is exceptionally high.

There are no fumes and operation is practically noiseless. Shops are cooler, more comfortable—manpower efficiency is increased. Shop space is increased, for an Ajax Holding Furnace takes an average of 30 to 40 per cent less floor space than any other furnace.

The Ajax companies have been pioneers in induction melting of metals since the first World War. To date they have installed more than 400,000 KW. of furnace capacity in the United States alone. This is the background of experience behind every Ajax installation.

AJAX ENGINEERING CORPORATION • TRENTON 7, NEW JERSEY

AJAX TAMA-WYATT INDUCTION MELTING FURNACE

Associate Companies: AJAX METAL COMPANY, Non-Ferrous Ingot Metals and Alloys for Foundry Use
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

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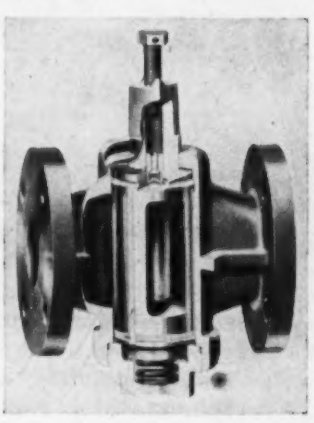
paint to the spray head at fluid pressures said to be lower than are commonly used, thereby cutting overspray losses. A positive displacement, immersion - type gear pump in the Paintmaster, driven by a rotary air motor, delivers

paint directly to the spray head, or pumps it through circulating supply lines. An agitator at the base of the pump keeps paint thoroughly mixed, maintaining uniform viscosity at all times. Two sizes are available: one, a portable 5-gal model for production and maintenance painting; the other, a 55-gal model for pumping to the spray head. *Gray Co. Inc. For more information, check No.* 49 *on the postcard on p.* 35.

Plug Valve

Long leakless service is claimed for a new lubricated plug valve that automatically compensates for wear. The cylindrical plug of the valve, known as the Homestead-

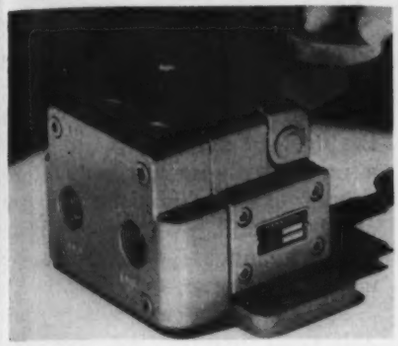


Reiser Self-Sealed Valve, has a wedge action that adjusts itself for wear and keeps the sealing surfaces of the plug and body in intimate contact at all times to provide a tight seal against leakage and lower lubricant losses. Line fluid pressure also acts on the plug to pro-

mote the sealing effect. Port areas equal the area of standard pipe. Positive visible stops limit operation to a quarter turn. *Homestead Valve Mfg. Co. For more information, check No.* 50 *on the postcard on p.* 35.

Air Valve

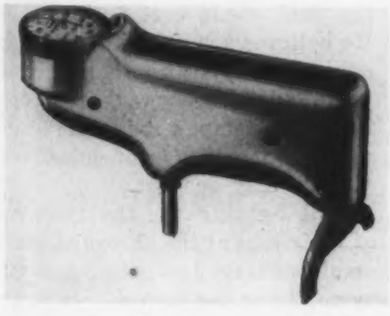
Four-way directional air control for the operation of single or double acting pneumatic cylinders and



other air operated equipment is provided by a new, fast cycling type hand operated valve. Air line pressure, acting through a pilot control connected to the control knob lever, supplies the force to move the piston operated main valve. Valve action is instantaneous. The valve is available in ½ and ¾ in. sizes for use with air line pressures of 25 to 150 lb. *Hannifin Corp. For more information, check No.* 51 *on the postcard on p.* 35.

Hardness Tester

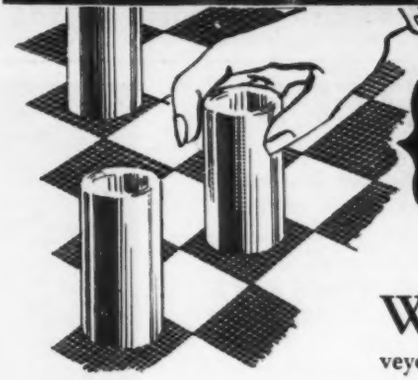
Nonferrous metal parts and fabricated plastic can be rapidly tested with the redesigned hand hardness tester. Suitable for spot checking



of stock, the Impressor can be used in any position, in any area that will permit the operator's hand. A conveniently located dial indicates material hardness. *Barber-Colman Co. For more information, check No.* 52 *on the postcard on p.* 35.

Resume Your Reading on Page 39

Coil Apron Conveyor is fitted with wooden cleats forming cradle for coils. Conveyor operates intermittently for advancing one coil at a time to coil box at mill in rear. Coil in foreground is discharging from tilting bed of Transfer Car to tail puller.



Whether it is a game of checkers — or the planning of a conveyor system in mill or factory, the right kind of *moving* pays off.

Logan engineers study every move, offer comprehensive handling solutions based on more than 40 years experience in serving the world's great steel mills and metal working industries.

Mill production men and metal fabricators both rely on Logan engineering to provide the correct type and weight of conveyor to do the job — with strength to spare.

In this era of keener competition, perhaps Logan can serve you, too. Write for literature today — no obligation.

Logan Conveyors

LOGAN CO., 545 CABEL ST., LOUISVILLE, KY.

Save Money by Buying Your

SCREW MACHINE PARTS from KEMPSMITH

Now — You can get high-quality screw machine parts from a reliable manufacturer at a substantial saving. In the modern, well-equipped Kempsmith plant, you will find a battery of six spindle automatics from 9/16" to 3½" diameter and single spindle machines from 9/16" to 6¼" diameter. Also plenty of hobbing, splining, broaching and other second operation equipment. These high-speed, precision machines are available to YOU for producing your screw machine parts. They enable you to get costs down to meet competitive bids. All metals can be processed. Send us your blueprints. Our quotation will follow immediately.

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Supplying the Needs of Industry Since 1888

FLOW METERS*

A visual, continuous indication of flow rate is provided by A.G.F. Flow Meters. Rate of flow is read directly in cubic feet per hour. Any change or interruption in the flow is immediately evident. Units are available for practically all gases used in industry, and many liquids. Gas capacities range from 1/4 to 3000 cubic feet per hour.

A.G.F. Flow Meters give an accurate, dependable reading at all times and insure uniform results by permitting duplication of previously determined settings. The patented alloy center-wire construction keeps the float permanently centered in the glass tube, and helps to damp oscillations resulting from minor variations of flow or pressure.

Many applications—A.G.F. Flow Meters are used for the measurement of the flow of atmosphere gases of all kinds, including carburizing gases, ammonia flow in Nitriding, hydrogen flow; and measurement of the flow of fuel gases, including city gas, natural gases, bottled gases such as butane and propane, and mixtures of gas and air.

*** Patented**

Write for new catalog No. C-1303, describing Flow Meters and other A.G.F. products including gas carburizers, heating machines, oven furnaces, pot furnaces and other heat-treating equipment.

AMERICAN GAS FURNACE CO.

1004 LAFAYETTE ST., ELIZABETH, N. J.

Navy Plans Project to Stop The Sinking of Terminal Island

San Pedro, Calif.—Despite the contested Navy decision to close down its shipyard here, the service is going ahead with plans to protect its $145 million investment against the sinking of Terminal Island.

The Navy has available $1,500,000 to start the protective project and is planning the construction of concrete walls. In addition to the doomed shipyard, it also has a major training station and receiving base and a military prison on the island. A former airfield now is abandoned with the hanger used for reserve activities.

Some controversy, which probably will involve the Ford assembly plant and the Bethlehem Pacific shipyard, has arisen as to the best method of protecting the island from further sinking a depth estimated at from 18 to 23 ft by 1963.

Navy Suggests a Method

Navy officers have suggested that the sinking of the harbor lands might be allayed by pumping water under high pressure into underwater oil zones or by reducing production of oil in the area.

Robert R. Shoemaker, chief harbor engineer of the Port of Long Beach (which includes half of the Los Angeles-San Pedro harbor), claims that repressuring the field would cost $323 million. He believes some control might be achieved if oil production were curtailed but says the "proper time" to attempt a reduction of the ultimate magnitude of subsidence already may be past.

Still fighting for the retention of their jobs at the shipyard, Navy employes staged a "public funeral" symbolizing the seriousness of the closing of the shipyard. In their printed obituary they listed death as of June 30, 1950, because of "public apathy, civic complacency, municipal inertia, bureaucratic favoritism, political impotency, community indifference and private muddling."

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Canadian Pig Iron Output For '49 Exceeds Like '48 Period

Toronto—Canadian pig iron production for September amounted to 168,436 net tons and compares with 180,115 tons in August.

In the 9 months ended Sept. 30, 1949, pig iron output totaled 1,659,003 net tons, which compares with 1,593,481 tons in the like period of 1948 and with 1,466,814 tons in 1947.

Production of ferroalloys in September amounted to 12,250 net tons compared with 12,562 tons in the previous month and with 12,318 tons in September 1948.

For the 9 months ended Sept. 30, 1949, cumulative production of ferroalloys totaled 169,534 net tons, compared with 127,610 tons in the 9 months of 1948 and 112,702 tons in 1947.

Following are comparative monthly production figures for pig iron and ferroalloys for 1949 in net tons:

MONTH	PIG IRON	FERRO-ALLOYS
January	183,074	21,931
February	172,724	21,713
March	202,130	22,457
April	180,740	24,427
May	202,148	20,652
June	194,255	19,264
July	175,381	14,280
August	180,115	12,562
September	168,436	12,250
Total 9 Months	1,659,003	169,534

Car Registrations Set Record

Detroit—New passenger car registrations in U. S. for 1949 will establish an all-time record, according to R. L. Polk & Co., Detroit, statisticians for the automobile industry.

During the first 9 months of this year, Polk said, new registrations totaled 3,548,296. The all-time record established in 1929 is 3,880,206 units.

During the first 9 months of this year, new passenger car sales exceeded the comparable period of 1948 by nearly a million units, Polk said.

It was also announced that new truck registrations for September 1949 were the highest for the past 12 months.

HALLDEN *Automatic Shears*

CUSTOM BUILT SHEARS FOR ANY APPLICATION

Hallden Automatic Flattening and Cutting Off Machines can be built into lines requiring special shearing applications.

Hallden Automatic Shears are designed to permit continuous feed of metal through the machine by synchronizing the flattener with the flying shear. Cutting accuracy can be held to plus or minus 1/64".

Hallden Shears are self-contained units which, under normal operation, require little maintenance other than lubrication.

Hallden's flexible design allows quick changing of shear knives and easy removal of flattening rolls for grinding. The shear knives always move in a mutual plane.

If you have a shearing problem, consult Hallden, *the shearing specialists.*

THE HALLDEN MACHINE COMPANY
THOMASTON, CONNECTICUT

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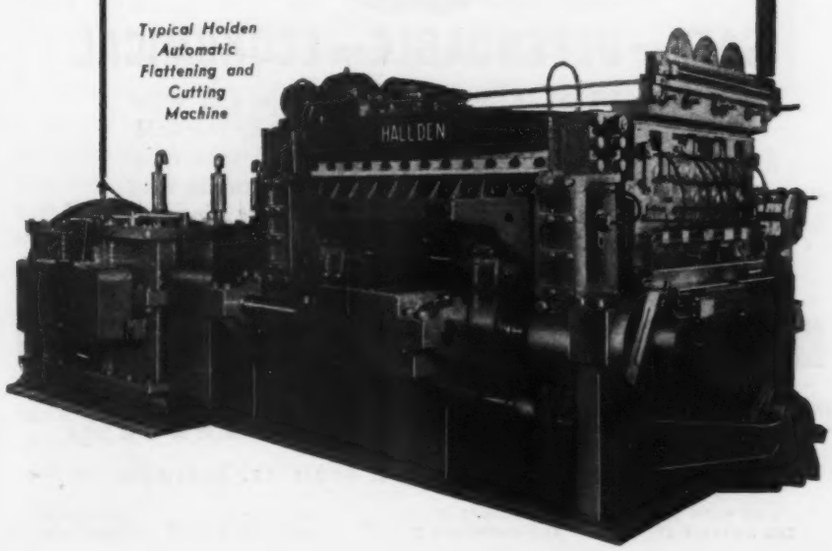


Typical Holden Automatic Flattening and Cutting Machine

Here's why it PAYS to use FAIRFIELD GEARS

★ MASS PRODUCTION ECONOMY

Large or small, you get the benefits of high production rates and big volume output at FAIRFIELD—the place where fine gears are produced to meet your specifications EFFICIENTLY, ECONOMICALLY!

★ QUALITY PLUS

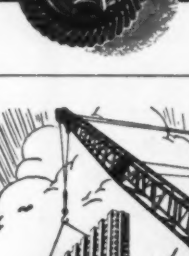
There is no finer recommendation for the quality of the product you sell than to be able to say that it is "EQUIPPED WITH FAIRFIELD GEARS!"

★ DEPENDABLE SOURCE OF SUPPLY

Supplier of precision-made, automotive type gears for thirty years to leading builders of construction, agricultural, industrial, marine, and automotive equipment.

★ COMPLETE PRODUCTION FACILITIES

Unexcelled facilities for producing Spur, Herringbone, Spiral Bevel, Straight Bevel, Hypoid, Zerol, Worms and Worm Gears, Splined Shafts, and Differentials to your specifications.



FAIRFIELD for FINE GEARS

FAIRFIELD MANUFACTURING CO.

305 S. Earl Ave., Lafayette, Indiana

SAFE—DEPENDABLE—ECONOMICAL

"HERCULES" (Red-Strand) Wire Rope and Wire Rope Slings have proved their fitness by the acid test of actual performance. There is a right type for any purpose. Our Engineering Department will gladly help you select the correct rope or sling for your particular needs.

We Invite Your Inquiries

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MADE ONLY BY

A. LESCHEN & SONS ROPE CO.

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New England Manufacturers Optimistic About the Future

Questionnaire shows 80 pct expect competitive position to improve.

Boston—New England manufacturers are generally optimistic about their outlook for the next 5 years. They also believe that the advantages of a New England location outweigh the disadvantages.

These are conclusions reached by the Federal Reserve Bank of Boston following analysis of 663 replies to a questionnaire survey sponsored jointly by the New England Council and the bank.

Eighty pct of the reporting companies expect their competitive position to remain the same or become stronger during the next 5 years. Only 15 pct forsee a weakening of their position, compared to 27 pct who expect improvement.

The companies who are most optimistic about their future operations are the producers of chemicals, apparel, stone clay and glass products, food, furniture, paper, instruments and clocks, electrical and non-electrical machinery and transportation equipment. However, pessimism is expressed by producers of leather and leather products, textile products, and lumber and basic lumber products.

Durable Goods Firms Optimistic

The same companies, when asked to appraise the future of their industries as a whole in New England, gave a somewhat different picture. Twenty-five pct of the companies expect their industries to weaken during the next 5 years, while only 14 pct anticipate improvement. About two-thirds of the companies expect their industry in the region to hold its own or to strengthen its position.

Manufacturers in the durable goods industries indicate that they have more advantages and fewer disadvantages in their New England locations than the producers of nondurables claim for themselves. This is to be expected from the fact that the producers of durables are more optimistic about their own future and that of their

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industry in New England than the soft goods makers.

Small firms, generally, reported more advantages in their location than did large firms. The most advantageously situated, according to their reports, are the companies with from 8 to 19 employees. The companies with more than 500 employees claim the fewest advantages per firm and the most disadvantages.

Movie Illustrates Stud Welding

Cleveland—Stud welding's part in cutting production costs is shown in an 18-min color sound movie, "Split-second Fastenings," recently completed for the Nelson Stud Welding Div. of Morton Gregory Corp., Lorain, Ohio. Applications of this automatic end-welding technique in the manufacture of automobiles, electrical equipment, production machinery as well as in construction, shipbuilding and railroad industries are shown in the film along with animated sequences which clearly explain the stud welding process.

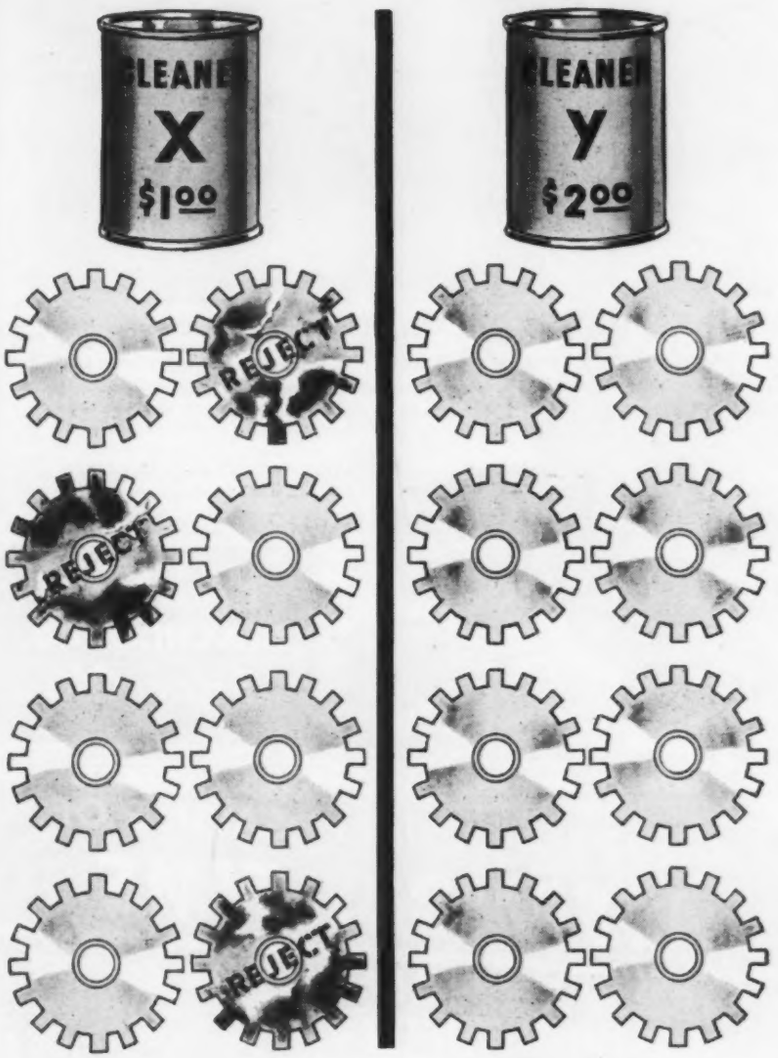
GIFS Elects Officers

Chicago — At the Grey Iron Founders Society 21st annual meeting held here recently at the Edgewater Beach Hotel, the following officers were reelected for the next year. They are, president, H. P. Good, Reading Textile Co.; secretary, R. G. Schaefer, Schaefer-Goodnow Co.; treasurer, H. J. Tenkamp, Ohio Foundry Co. One new officer was added as a vice-president, H. L. Edinger, Barnett Foundry & Machine Co.

Places Order for B-36 Parts

Dallas — Additional orders for B-36 parts have been placed with Texas Engineering & Mfg. Co., Inc. by Consolidated-Vultee Aircraft Corp., according to TEMCO officials. The new orders include fabrication and chrome plating of Ailerton tab hinge pins, fabrication of lock cylinders and handle assemblies, and additional duct work for the B-36 heating and ventilating system.

WHICH COSTS MORE?



Two brands of metal cleaners, designed to do the same job, often produce altogether different results. One may sell for less and still cost far more to use in the long run.

Your best guarantee of economy and quality in the cleaning products you buy is the reputation of their maker. Proved cleaners help insure *your* products against rejects and failures in service. This kind of "insurance" pays for itself and earns big dividends for you in repeat orders and customer good-will.

Wyandotte Metal Cleaners are made by the world's largest producer of specialized cleaning compounds. *Balanced* Wyandotte Cleaners are made for soak, electrolytic, spray and tumble operations, as well as for degreasing, paint stripping, burnishing and burring.

All of these up-to-date products meet exacting performance specifications. Fifty-nine years of experience stand behind their Wyandotte trademark. No matter what your cleaning needs may be, it will pay you to call your nearest Wyandotte Representative. If you have some unusual problem, our skilled technical service staff will be glad to help you.

Wyandotte Chemicals Corporation
WYANDOTTE, MICHIGAN
SERVICE REPRESENTATIVES IN 88 CITIES

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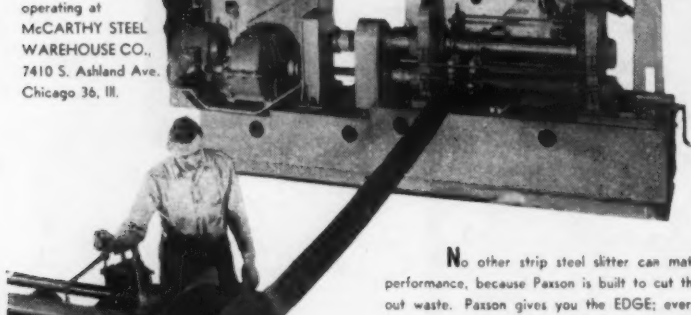
REG. U. S. PAT. OFF.

INCREASE YOUR PROFITS BY SALVAGING COIL ENDS



This PAXSON SLITTER LINE operating at McCARTHY STEEL WAREHOUSE CO., 7410 S. Ashland Ave., Chicago 36, Ill.

No other strip steel slitter can match Paxson's performance, because Paxson is built to cut the coil without waste. Paxson gives you the EDGE; every pound of metal can be put to use. Easily adjusted, you can slit widths up from 1/2 inch at a high rate of speed. Get the details today. Write, wire or phone if you want to talk to H. D. Paxson personally. Paxson will be glad to discuss your problems with you.

PAXSON MACHINE CO.
Salem, Ohio

THERE'S A DEFINITE SAVING OF ASSEMBLY TIME WHEN YOU USE...

UNBRAKO

KNURLED SOCKET HEAD CAP SCREWS

The *Knurled* Head of the "UNBRAKO" Socket Head Cap Screw does triple duty: (1) the *Knurling* provides a sure, slip-proof grip; (2) the *Knurling* speeds assembly, because it enables the "UNBRAKO" to be screwed in faster and further with the fingers—handiest of all wrenches—before a "key" becomes necessary; (3) the *Knurling* permits positive locking. Available in standard sizes from No. 4 to 1" diameter, in a full range of lengths. Other sizes to special order. Write for your copy of the "UNBRAKO" Catalog.

Knurling of Socket Screws originated with "Unbrako" in 1934.

Other "Unbrako" Products Include:

Self-Locking Socket Set Screws with Knurled Cup Points, Self-Locking Socket Set Screws with Knurled Threads, Self-Locking Square Head Set Screws with Knurled Cup Points — all patented, self-locking screws that won't shake loose! Socket Head Stripper Bolts with Knurled Heads. *Precision-Ground* Dowel Pins. *Fully-Formed* Pressure Plugs.

SPS STANDARD PRESSED STEEL CO.

BOX 523, JENKINTOWN, PENNSYLVANIA

"Serving industry continuously since 1903 through Industrial Distributors"

Canadian Ingot Production Sets a New Record for 9 Months

Toronto—Canadian production of steel ingots and castings for September 1949 amounted to 240,748 net tons, which is less than August when output amounted to 248,749 net tons and compares with production of 257,865 tons in September 1948.

In the first 9 months this year cumulative production of steel ingots and castings totaled 2,404,368 net tons, a new all-time high record for the period, and compares with 2,361,387 tons in the corresponding 9 months of 1948 and with 2,183,564 tons in 1947.

Following are comparative monthly production figures for steel ingots and castings for 1949 in net tons:

MONTH	STEEL INGOTS	STEEL CASTINGS
January	275,987	8,720
February	249,009	10,262
March	287,885	10,576
April	260,319	9,649
May	283,808	9,371
June	261,476	8,979
July	232,499	6,331
August	241,442	7,307
September	232,882	7,866
Total 9 months	2,325,307	79,061

NAPA Reapproves GIFS Sales Code

Cleveland—The National Assn. of Purchasing Agents recently reapproved the Terms and Conditions of Sale of the gray iron foundry industry as compiled and published by the Gray Iron Founders' Society, Inc.

Originally approved by NAPA in March 1931, the code was reapproved incorporating a few minor changes deemed to clarify certain provisions of the former code. The code consists of a compilation of standard practices governing the sale of the industry's product. Their use has undoubtedly saved both buyers and sellers much litigation by clearly setting forth the conditions under which sales of castings are made. While their adoption and use are optional among members, their soundness and value have been thoroughly tested by time and wide application.

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Auto Production to Be Affected by Plant Closures

Detroit — The combined effects of the steel strike and the annual hegira of Michigan deer hunters to the woods are expected to take a heavy toll in automobile production during the coming weeks.

Buick is expected to close about Nov. 23 for a minimum of 10 days for a changeover of its Supers and Roadmaster models. Fisher Body Plant No. 1 which supplies Buick will go down at the same time.

Chevrolet will probably be closed for a minimum of 2 weeks early in December. This will also close Fisher Body Plant No. 2 at Flint which supplies Chevrolet. Other Chevrolet assembly plants may build cars for several days longer but will also close eventually for inventory and model changeover.

AC and other suppliers will probably be affected by the Flint shutdown. Oldsmobile is expected to continue production through the early part of December before closing down. A brief Cadillac shutdown is expected to come during December.

Pontiac has announced a shutdown prior to the Thanksgiving holiday. Last week Pontiac officials declined to speculate on the length of the shutdown.

Meanwhile, Ford is expected to continue production at least through November and into December. Three Chrysler divisions are already closed and are not expected to reopen soon.

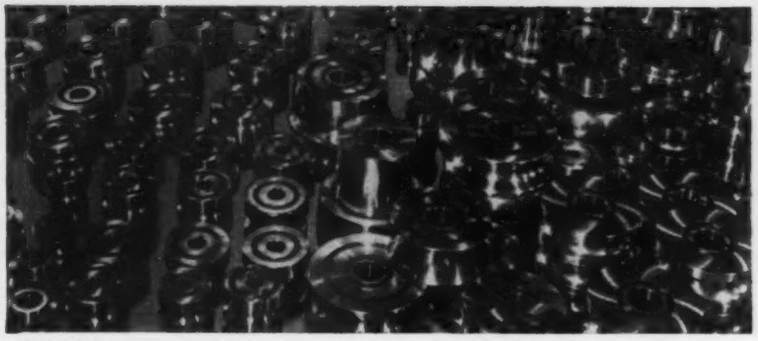
Hudson and Studebaker are expected to continue operations for a few weeks longer. Willys-Overland has made no announcement about resuming operations at Toledo.

Offers Scientific Scholarships

Washington—Scientific scholarships leading to full-time federal employment are now being offered by the National Bureau of Standards.

Students with 2 years' college credit are now permitted to participate in research programs offered by the bureau.

ARDCOR TUBING ROLLS



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Gas or diesel, 12 to 37 ft. booms or adjustable telescopic booms; solid or pneumatic rubber tires. Buckets, magnets, and other accessories available.

THE ORIGINAL SWING BOOM MOBILE CRANE WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER

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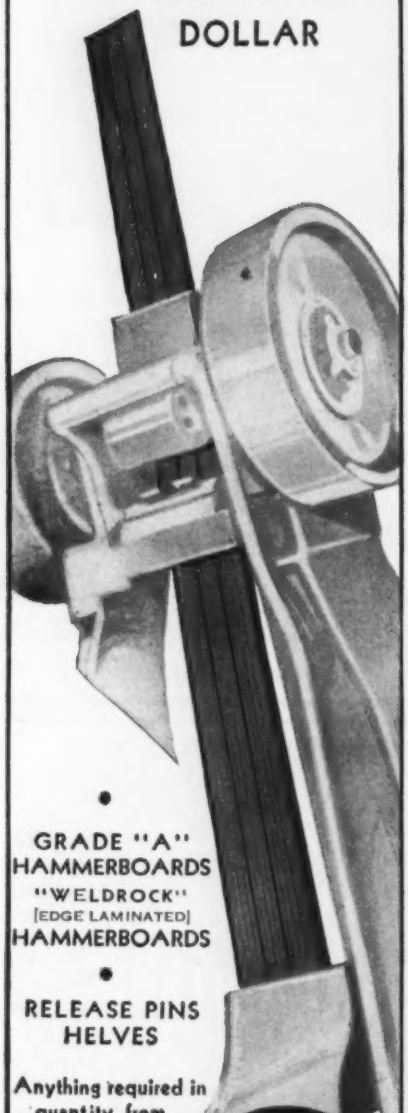

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Dear Editor . . .

QUALITY CONTROL

I have recently reread an article in the July 3, 1947, issue of THE IRON AGE written by E. E. Bates entitled, "How to Increase Tolerances and Obtain Closer Fits." I think this article describes one of the neatest applications of statistical quality control that I have come across; hence the present request.

I have a course in statistical methods in business in which I emphasize quality control rather heavily. I find it extremely helpful to distribute articles like the one noted above whenever I can get reprints. If you distribute reprints for educational purposes, I should very much appreciate your forwarding me as many copies as your stock will permit; I can use up to 200. If reprints are not available, I should equally appreciate your permission to reproduce the article in whole or in part for class distribution.

BLAINE M. COOKE.
Instructor in Statistics
University of Minnesota, Minneapolis

We do not have reprints of this article, however, permission is granted to reproduce the article.—Ed.

AUTO DESIGN

Under Assembly Line in your November 10 issue reference is made to statements made by Mr. Mortrude at the meeting of the American Society of Body Engineers, referring particularly to a desire for lower and shorter engines and advocation of improved cooling methods permitting extensive front end design changes. I will appreciate it if you can advise if these remarks were in written or paper form and if so, where a copy may be obtained.

L. P. SAUNDERS,
Harrison Radiator Div., General Motors Corp., Lockport, N. Y.

A copy of this paper, presented recently to the Detroit section of the American Society of Body Engineers, is being forwarded to you.—Ed.

TOOL STEEL DIRECTORY

Would like to receive latest edition of "Directory of Tool Steels." Please bill us for the charges.

H. O. SIMON
Asst. Master Mechanic
Rochester Products Div., G.M. Corp. Rochester, N. Y.

While they last, the tool steel directory is available at $2.00 each for one or two copies, $4.50 for 3 copies, and $1.00 each for 6 or more copies.—Ed.

GLASS SOLDER

In Newsfront of the April 5, 1949, issue of IRON AGE we read about a solder with an indium base for hermetically sealing glass to metal or glass to glass. We should like to get further information, and request you to direct our inquiry to the manufacturer of that solder.

M. STOCKMEYER
Robert Bosch, GMBH, Stuttgart, Germany

Further information regarding this solder may be obtained by contacting O. J. Seeds, Cerro de Pasco Copper Co., 40 Wall St., New York.—Ed.

HYDROGEN IN STEEL

On page 11 of your issue of October 20, 1949, there is an item about rapid and accurate analysis of hydrogen in steel using a tin-fusion technique. Would it be possible for you to provide me with information as to how or where I may secure further details of this process.

R. H. HAY,
Head of Physics Div.
Aluminum Laboratories, Ltd., Kingston, Ontario

Work on these techniques was done by Dr. D. J. Carney in collaboration with Professors J. Chipman and N. Grand, Metallurgy Dept., Massachusetts Institute of Technology under auspices of the Office of Naval Research.—Ed.

STEEL EXTRUSION

In the October 20, 1949, issue of THE IRON AGE there is an article on "French Process Extrudes Steel." We would appreciate it if you could supply us with the source of the information in this article.

PHILIP H. BURDETT,
Mgr. Ammunition Div.
Remington Arms Co., Inc., Bridgeport, Conn.

Source material for this item was provided by Graham W. Parker, Industrial Consultant, 230 Park Ave., New York 17.—Ed.

DUCTILE CAST IRON

We would like to have several copies of the article "Ductile Cast Iron" which appeared in the Feb. 17 issue.

M. C. PARCHE
Carborundum Co. Niagara Falls, N. Y.

FOUNDRY COSTS

We would like to get some statistical or advisory information as to the amount a metal foundry and fabrication company may safely spend in this section for land, buildings and

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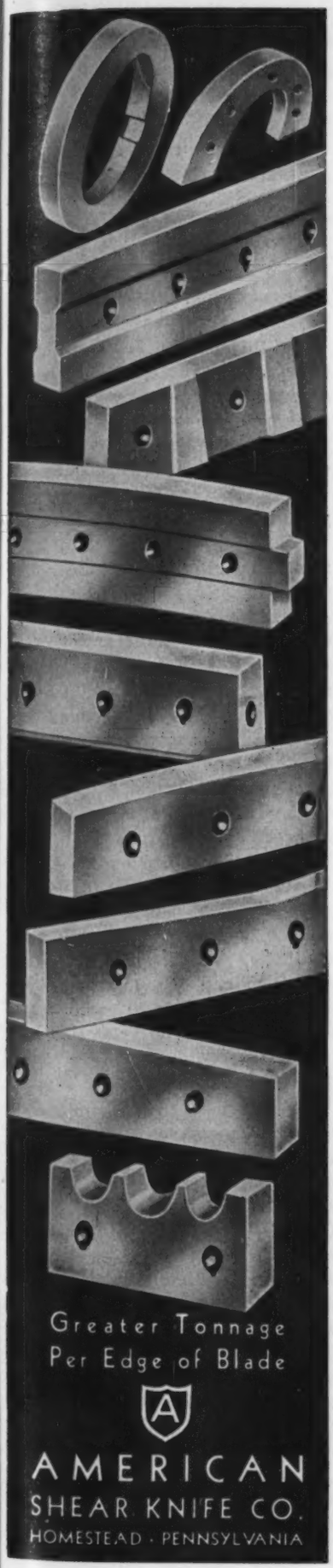

heavy equipment per annum. We desire national and regional averages as to a safe or reasonable proportion of its gross income expendable in these categories.

ROY A. SCRUGGS
Miller, Martin, Hitching and Tipton
Chattanooga, Tenn.

The Gray Iron Founders Society, Inc., National City Bank Bldg., Cleveland 14, is the most likely source for this information. The Society has made a number of cost studies relative to foundry operation.—Ed.

TOOL STEEL DIRECTORY

We find your booklet entitled "Directory of Tool Steels" very valuable and receive many requests for the use of this directory for reference purposes. We would be pleased if you would forward 12 additional copies.

JAMES S. ROMP
Advertising Supervisor
Atlas Steels, Ltd.
Welland, Canada

IRON ORE

We are in a position to supply large users of magnetite iron ore and would appreciate your forwarding us a list of names and addresses of mills that would be interested in same. Also we would like to obtain a direct source of supply for mild steel sheet, black, 18 x 24 in., 29 to 32 gage. Can you help us?

W. L. LEO
Manager
China Mutual Importing Co.
Seattle

ICED STEEL

We are desirous of securing several copies of the article entitled "Low Temperature Treatment Steel" by H. E. Boyer and which appeared in the Feb. 12, 1948 issue.

THOMAS LOPICCOLO
Chief Engineer, Refrigeration Div.
Bowser, Inc.
Terryville, Conn.

Our supply of tear sheets of "Low Temperature Treatment Steel" is exhausted. However, you might try a back issue magazine dealer, or we can make photostatic copies at cost.—Ed.

ELECTROPOLISHING BRASS

Kindly send a copy of Willard G. Axtell's article "Electro-polishing Brass" which appeared in the June 30 issue.

I. WILLIAM MARCOVITCH
Plant Chemist
United States Gauge Div.
Sellersville, Pa.

FRACTURE OF METALS

Tear sheets on your recent article on fracture of ductile metals by J. E. Dorn, of the University of California, would be appreciated.

F. R. MORRAL
Assoc. Prof., Dept. of Materials Engineering
Syracuse University
Syracuse, N. Y.

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Geneva Steel Expects Few Delays in Reaching Full Production

Salt Lake City—Geneva Steel Co. facilities will be gotten back into operation with very little delay since settlement of the strike by U. S. Steel Corp.

The company has enough coal on hand for a 45 to 60 day operation at both the Geneva plant and Ironton blast furnace so a speedy resumption of production is not dependent upon the decisions of John L. Lewis.

Enough slabs are stockpiled to keep the plate mill operating until blast furnaces and openhearths can be gotten into production. The plate mill was rolling within 36 hr after settlement. However, about 10 days will be required to get blast furnaces and openhearths back to the prestrike production level.

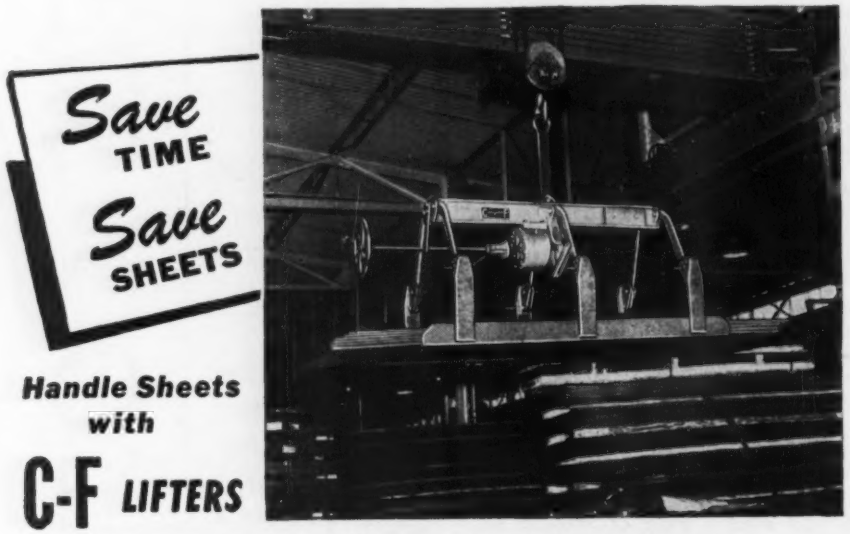
The company's captive coal mines are now closed and the plan is to reopen them after the strike as coal is needed. This means that full production would not be immediately resumed.

On the whole things have gone smoothly between the company and the union with respect to maintenance and protective work. The union has supplied an adequate number of men for the job and has not been fussy about admissions into the plant.

Cleveland Graphite Sales, Net Up

Cleveland—Cleveland Graphite Bronze Co., Cleveland, reported sales of $22,363,157 and net profit of $2,164,933 for the first 9 months of 1949. The profit is equal to $3.14 a share. Sales in the same period a year ago were $20,330,953 and net profit was $1,676,508.

Sales for third quarter of 1949 were $6,795,502 compared with sales of $586,620 for the like 1948 period.



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C-F Lifters are available in capacities from 2 to 60 tons or larger, in standard or semi-special designs.

Write for the bulletin "C-F Lifters"

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1303 S. Kilbourn Ave., Chicago 23, Ill.

HANDLE SHEETS with C-F LIFTERS

Predicts a Little Boom

Chicago—In a talk before the Chicago Executives Assn. at the Blackstone Hotel here recently, John L. McCaffrey, president, International Harvester Co., predicted a "little boom" following the current wave of strikes. He said the boom will stem from a buying spree as businessmen strive to build up depleted inventories. He predicted that stable or slightly rising prices will aid sales generally. He expanded this idea by telling the group that purchasers now realize that prices cannot decline in the face of pension grants in two basic industries.

"Business is better than businessmen think it is," Mr. McCaffrey declared. He cited the experience of his own company where International Harvester Co. has had fewer price complaints recently than in the first 6 months of the year. He acknowledged that firming prices might not be good for the economy even though it is good for business.

The executive of International Harvester Co. warned that many practices developed over the past 10 years must be entirely forgotten. "We need people who like to get an order and will stay at it until they do. Salesmen are never successful on a 40 hr week. We must find salesmen who know nothing about a 40 hr week."

Accident Frequency Rate Drops

New York—The steel industry's safety performance has shown improvement over the past 4 years, according to records of the Metals Section of National Safety Council. This was the fourth consecutive year during which the steel industry has lowered the accident frequency rate among its employees. During the 12 months ended June 1949, steel companies set a new record in safety performance of fewer than six accidents for each million man-hr of work.

Last year the steel industry topped all heavy industry in job safety and ranked fourth among all industries, light and heavy.

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FATIGUE CRACKS

Continued from Page 20

torial bigwigs of the magazine *World Oil*, should know what he's talking about when he calls our economic stethoscope "retrogressive forecasting."

"We find that in the majority of cases, photographs sent out by executives and others who have reason to expect publicity are as much as 5 years old. Just another case of the 'old man' trying to smooth over the wrinkles he gained in getting to where he'd be promoted. It's on a par with the trick of the balding gentleman who lets his fore (or nape) lock grow long and combs the few wisps charitably across the otherwise naked scalp."

Mr. Sterrett polishes us off with the rejoinder that "the casts of countenances reproduced in a current issue would indicate not tomorrow's trend, but yesteryear's dyspepsias, heartburns, and golf scores."

We can't see that this objection is very serious. Nearly all the most widely accepted theories on economics are based on studying charts to see what happened the last time around the cycle.

Omen

Just what the U. S. Dept. of Commerce is expecting in the way of world shaking events, we wouldn't know. But your f.f.j.'s Washington bureau considers it significant that the department's news and information directory for correspondents lists the home phone of a man wtih the Coast and Geodetic Survey with the notation, "for earthquake information only." If the world seems wobbly about 3 a.m. you might call him to find out what's up.

Just Talk

Not the least of the spawn from the steel strike is the resurgence of conversion arrangements, whereby steel bounces from mill to mill before it emerges a high-priced finished product. It's a game where fast talking individuals thrive, sometimes selling a few thousand tons of steel before they know where it's coming from.

Your f.f.j. mentioned the revival of conversion deals in its news release a fortnight ago, and United Press promptly passed the word along to newspapers all over the country. By the time the typesetter at the *Chicago Daily News* got through with the item, one sentence read, "Steel buyers, particularly those in Detroit, are redoubling their efforts to line up conversation deals."

Not far from the truth, at that.

Resume Your Reading on Page 21

NOW YOU CAN GET
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WHEELBARROWS

No. S5W — for handling sand and other dry materials. 14 ga. tray. Max. cap. 4 cu. ft.

You'll like these new, lightweight, easy-wheeling Sterlings, designed for faster material transport service. Famous Sterling balanced construction puts 80% of the load on the wheel . . . only 20% on operator. Equipped with long wood handles, formed to fit operator's hands. Steel channel legs and reinforcements are just the right height. Means less stoop for operator and greater leg clearance. Steel wheel, roller bearing wheel with pneumatic tire or zero pressure cushion type wheel, can be furnished. Write for new Wheelbarrow Catalog.

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Look for this Mark of STERLING Quality

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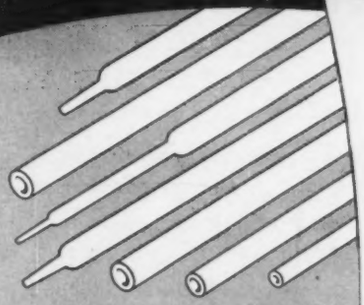

Every stage of production in the manufacture of McDanel Porcelain Combustion Tubes and Zirco Tubes is carefully controlled to assure outstanding performance in your carbon and sulphur determinations.
Density, bore size, wall thickness, gas tightness, resistance to thermal shock — are all checked before shipment. When you receive your order of McDanel Combustion or Zirco Tubes from your supplier you may have complete confidence in their ability to give unexcelled service.

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Steel Output in Detroit Area Bounces Back Quickly

Detroit — Steel production has picked up rapidly at Detroit since the end of the strike. The operating rate for Detroit for the week of Nov. 21 was 98 pct.

As of Nov. 17, approximately 75 pct of Great Lakes employees had returned to their jobs. Blast furnaces, coke ovens and openhearths are all operating again although considerably below capacity.

Plants Will Still Close

Ford is operating the majority of its openhearths, and melting operations have been resumed in the company's electric furnace department. The company recently disclosed it has been called on by a number of its suppliers to furnish steel required to make Ford parts.

Rotary Electric has been back in operation for more than two weeks and is operating close to the capacity of the plant. All employees idled during the strike have returned to their jobs.

Preliminary operations have been under way at Detroit's newest plant, the McLouth Steel Corp. at Trenton. Full production is expected to be reached not later than Jan. 1, when the plant will employ 800 workers.

McLouth recently signed a new contract with the United Steelworkers Union embodying a pension plan modeled after the Bethlehem Steel agreement.

It now seems fairly certain that all auto plants except Ford will be closed for varying periods of time during the next 6 weeks. The steel strike, model changeovers and inventory taking will account for the shutdowns. The industry is more than a little wary that steel shortages in supplier plants will sooner or later catch up with auto production plans.

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PRICES are still the main topic of conversation . . . FEAST OR FAMINE ON SALES . . . A low cost for production must be attained.
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Large stocks in principal cities
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Converts Great Lakes Freighter

Cleveland — Columbia Transportation Co. let contracts recently for conversion of its Great Lakes bulk freighter, the S.S. W. C. Richardson, to a crane-equipped self loader-unloader. With the conversion of the Richardson, Columbia, operator of 17 freighters on the Great Lakes, will have a fleet of five crane-equipped self loading-unloading vessels, which are engaged primarily in the transportation of pig iron, finished steel and scrap.

The Richardson will be converted this winter at the South Chicago yard of American Shipbuilding Co. The vessel will be equipped with two American Hoist & Derrick diesel-electric traveling cranes weighing approximately 140 tons each and will move up and down the deck on rails.

Russian Ore Imports Up 50 Pct

Washington — Imports of manganese and chrome from Russia more than doubled in September, increasing from $300,000 worth in August to $700,000, Census Bureau figures show.

This was in almost exact proportion to the overall increase in imports from the USSR, which rose from $3 million to $7.1 million.

Exports to Russia remained static for the month at $100,000 although exports to satellite nations increased somewhat, from $6.5 million to $7.8 million. Soviet exports to the United States accounted for nearly all of the increase from eastern Europe, from $8.3 million to $11.5 million.

Electric Auto-Lite Sale Rise

Toledo—For the first 9 months of 1949, The Electric Auto-Lite Co. reported earnings of $7,330,652, or $4.90 per share. Earnings for the like period in 1948 amounted to $7,828,374, or $5.24 per share.

Sales were $167,975,049, or 15.2 pct over the sales for the first 9 months of 1948, which totaled $145,708,318.

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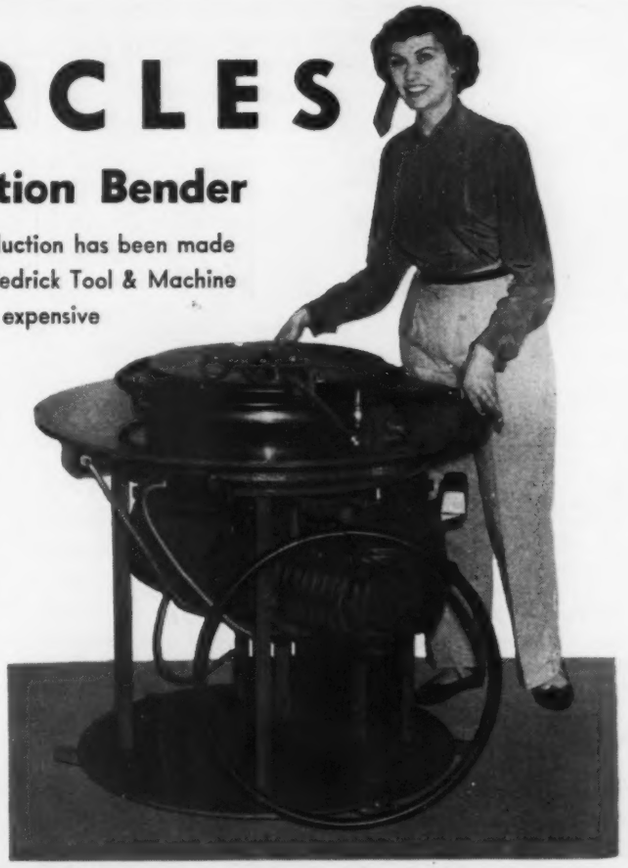
FULL CIRCLES

On a Pedrick Production Bender



The bending of helical coils and full circles in production has been made easy by a development recently completed by the Pedrick Tool & Machine Company. Normally such a procedure means an expensive mechanism unless the operator is prepared to substitute a lot of manual adjustment, with consequent loss in production. In this new machine a helix may be wound at relatively high speed, which may be relay controlled if desired, so as to cause the bend to end at a certain point. If desired, a shell die may be set over the bend and a second helix wound on top if a double helix is desired. U. S. Patents have been applied for.

Write for further information

PEDRICK TOOL AND MACHINE COMPANY

3640 N. Lawrence Street, Philadelphia 40, Penna.

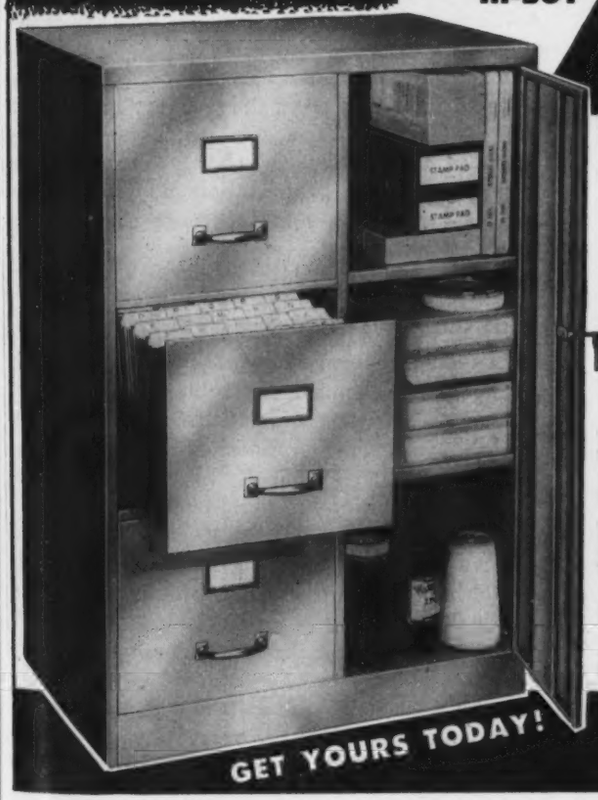
THE BIGGEST IDEA IN OFFICE EQUIPMENT!
designed for you, and you!

Steelmaster HI-BOY

TWO-ALL-IN-ONE

THE COMPLETE JR. CORRESPONDENCE & SAFETY STORAGE CABINET-IN-ONE

FILE IT . . STORE IT . . IN-ONE-UNIT!



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  3 spacious storage shelves—outside door with lock and key. Made of heavy gauge furniture steel.

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No.	DIMENSIONS	Ship. Wt.
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Available in Futura Grey and Steelmaster Green.

For locks on letter drawers, add $2. per drawer.

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GLOBAL LETTER

REVIEW OF WORLD MARKETS

Continued from Page 26

Although domestic demand has shown some improvement since the end of vacations, the main contribution to increased output has come from foreign markets.

Trade Balance Improves

Exports to foreign countries and French overseas territories, which averaged 56,000 tons monthly last year, increased to 111,600 during the first 6 months of the year, 175,000 tons in September and 251,000 tons in October. These figures are based on reports from the French Custom's Administration. They include the Saar iron and steel exports beginning in April 1948.

British Steel Workers Agree Not to Seek New Wage Boosts

London—The Trade Union Council has made an appeal to all unions with wage claims outstanding to postpone negotiations until a final settlement is made on post-devaluation trade union policy.

Reaction has been varied but outstanding support has come from the workers in the iron and steel trade. The steel workers have announced that they are ready to suspend the agreement under which their pay rises with the cost of living and to freeze their wages for 12 months.

Sells Output of Plant Being Built

London—General Motors Diesel Ltd., which is erecting a $5 million plant at East London, Ont., has sold the first 58 Diesel locomotive units scheduled for production in the new plant to the Canadian Pacific Railway, according to E. V. Rippingille, Jr., president.

The president stated that 10 road locomotives of several units each and a number of one-unit switching locomotives are included in the $2,500,000 order.

The plant, which is now under construction here is scheduled to be completed and in operation by next July and will have a capacity of 195 road engine units per year.

Resume Your Reading on Page 27

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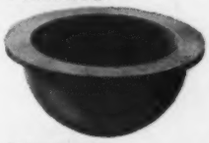
MELTING POTS

LONGER SERVICE LIFE, MINIMUM IRON PICK-UP CUT OPERATING COSTS

POURING

MELTING



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Hand Operated Weight 70 lbs.
Capacity 7/16" hole through ¼" metal

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Round ○ 1/16" to ½" by 1/64ths, & No. 30, No. 24, & No. 19 Drill Size

Flat □	Regular Oval ⬭	Semi-Circular End Oval ⬭		Square □	
3/8"x1/4"	1/2"x9/32"	1/2"x5/16"	11/32"x9/32"	3/8"	17/64"
5/16"x1/4"	1/2"x3/16"	1/2"x9/32"	11/32"x7/32"	11/32"	1/4"
5/16"x3/16"	1/2"x5/32"	1/2"x7/32"	5/16"x1/4"	21/64"	7/32"
1/4"x3/16"	13/32"x9/32"	1/2"x3/16"	5/16"x9/64"	5/16"	3/16"
1/8"x3/8"		1/2"x5/32"	9/32"x7/32"	9/32"	5/32"
		7/16"x13/64"	7/32"x5/32"		9/64"
		3/8"x5/32"			

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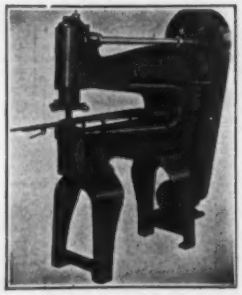

"NIBBLE YOUR COSTS"

Dear Customer

by *Jack R. Hight*

TO: Jack Hight
FROM: W. G. Patton, Detroit Regional Editor

You can use this for a starter on "The Assembly Line" column you have in mind.

Probably the biggest surprise that comes to the editor of the Assembly Line is the question, "Where do you get all the information you have in the column?"

The question is a surprise because what is printed probably represents less than 10 pct of the information that is available and might be used if there were no limitations on space and time.

Another interesting thing about this job: What you supposed were your most innocent words often get you involved in the hottest controversy. Not so long ago we innocently referred to a new model Buick and said it should not be described as a 1950 model. These were specific instructions from Buick. However, a Buick dealer sold one of these cars to a customer as a 1950 model. (Natch) We got the initial explosion of the customer's wrath.

Another time we got an irate letter from a reader calling attention to the absurdity of claims that in a contest a car was driven nearly 90 miles on a gallon of gasoline. We got out of that one by mentioning the latest contest winner was able to coax his car 140 odd miles under the conditions of the contest. We hasten to add before another letter arrives that the contest conditions resemble actual driving in traffic as *little* as possible.

In the course of any given week we're likely to be accused of being anti-Tucker and pro-Tucker. In an average month we attend anywhere from four to seven technical meetings here in Detroit. Every week, there is at least one press meeting, and there may be as many as four or five.

Preparation of the Assembly Line column invariably starts on Monday. The first step is to read *all* the papers. Trade papers are next. Then come the releases that pour over a district editor's desk at a rate of 15 to 20 minimum per day. By about Wednesday the decision is made as to what should be included in the Assembly Line.

The real work, begins at this point. Every story requires a critical study of available material. This we always attempt to add generously, either from the same source or an outside source. With this in mind, we usually dictate or type the column in the rough for a starter. The final Assembly Line usually has only limited resemblance to the original copy but a great deal depends on the subject matter.

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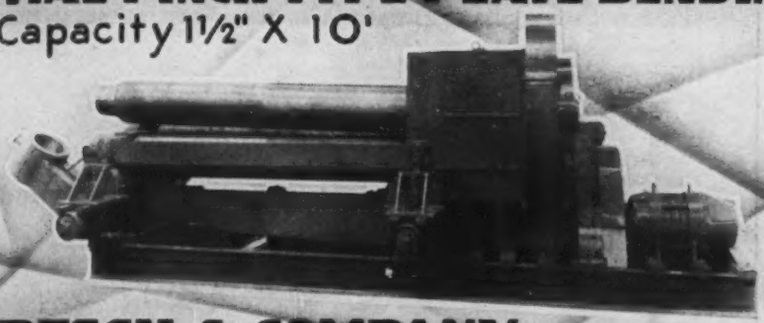

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Landis Threading Mach. 1" two spin., lead screw, Lanco Hds., single up to 4"

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MANUFACTURED BY ETNA STANDARD, CAPACITY FROM 14 GA. TO 20 GA., 9 TOP ROLLS, 8 BOTTOM ROLLS, 51" x 4" DIA. ROLLS, FORCED FEED LUBRICATION, COMPLETE WITH D.O. JAMES SPIRAL BEVEL REDUCTION UNIT, AND 20 HP, 230 VOLT, DC MOTOR AND CONTROLS.

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THE CLEARING HOUSE

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

New plan proposed to stimulate overseas sales

Automatic transmission tooling watched by Detroit dealers

MDNA gets new Executive Director

Newark exports reported slow

Detroit Used Dealers Watch Automatic Transmission Tooling

Detroit—Hopes that tooling for automatic transmissions would prove a stimulus to the used machinery business have been damped by the decision announced by one firm to use new equipment exclusively. However, the fact that this has not been the general trend has kept most Detroit dealers hopeful. Dealers in this area report mixed trends. Some feel that the strikes took the edge off business, while others admit a sizable increase since the beginning of the strikes. Most dealers are optimistic about the fourth quarter and many report volume has picked up and prices are fairly stable.

Newark Dealers Report Overseas Sales Slackening

Newark—Dealers in Newark whose activities embrace the overseas sales of used and rebuilt machinery see a slight slackening of orders in latter November as compared to good business during October and the first half of November. Trade with Europe held a constant level until this time; the devaluation not having any apparent effect upon sales volume.

Now dealers report fewer inquiries and sales but are not sure the devaluation is causing it. Most dealers feel that the fluctuation in order volume is in direct proportion to the energy expended in digging up the business.

With regard to South American exports, one firm reports that old type lathes are getting quite a play from Peruvian firms.

MDNA CHAPTER MEETINGS

CHAPTER	DATE	TIME	PLACE
Detroit	Tues. Dec. 13	7:00 p.m.	Hackett Co.
Chicago	Fri. Dec. 16	6:30 p.m.	Hylers' Restaurant
New York	Mon. Dec. 26	6:30 p.m.	Cavanagh's
Philadelphia	Tues. Dec. 27	6:30 p.m.	Warwick Hotel
Los Angeles	Tues. Dec. 27	6:30 p.m.	Elks Club

* Special Christmas Dinner Party

Fox New Head of MDNA

Chicago—John M. T. Fox has been appointed executive director of the Machinery Dealers National Assn., succeeding R. K. Vinson, who left the organization to found the Research Institute for Used Machinery and Equipment Dealers. Mr. Fox is a graduate of Columbia University and has been in the civil engineering field for many years including projects in England, the Philippines, South America, Saudi Arabia and this country as well. Mr. Fox started his official duties Monday, Nov. 14 in the MDNA executive offices at 20 N. Wacker Dr., Chicago.

Keating Outlines Plan For Foreign Used Machinery Sales

Chicago—Arthur Keating, president of Ecko Products Co., Chicago, recently outlined a plan whereby used American machinery could be profitably employed abroad. He said the Government should offer American firms two simple inducements that could put to work immediately in Point 4 nations a vast reservoir of used American mass production machinery. The inducements are:

Turn to Page 190

SIMMONS ENGINEERED Machine Tool REBUILDING NEWS

SIMMONS MACHINE TOOL CORPORATION • MAIN OFFICE AND PLANT, 1721 N. BROADWAY, ALBANY, N. Y.

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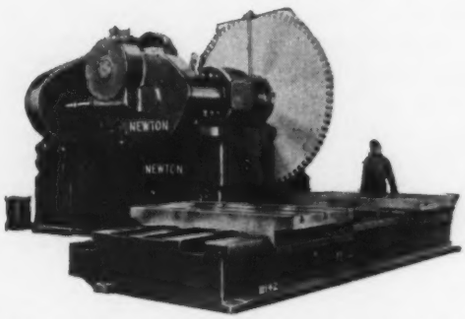
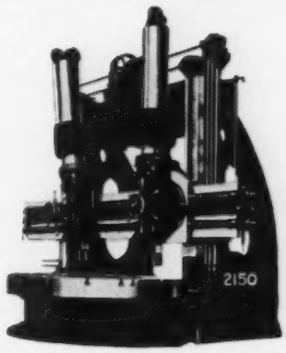


120" NEWTON (Consolidated) Type U-97-A Heavy Duty Cold Saw. Hydraulic Feed, capacity round 44", square 42" x 42", 75 H. P. Main Drive Motor. Inspect at Albany.



84" BETTS Heavy Vertical Boring and Turning Mill, 2-swivel heads on rail. Ring counterbalanced rams, P. R. T. Approximate Weight 60,000 lbs. Inspect at Albany.

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NEW YORK CITY OFFICE: 50 EAST 42nd STREET

GUARANTEED

42" x 24' c/c N-B-P Lathe, M.D.
24" x 168" c/c Sidney 16 sp. Lathe, 1942
16" x 54" c/c American Pacemaker, 1942
3—#26 Kempsmith Universal Millers, 1944
#4 Cincinnati Plain Hi-Power Miller
54" Colburn-Consolidated Vert. Bor. Mill, PRT.
36" Rogers Vertical Turret Lathe, 1942
#1-18, #3-24 Cincinnati Prod. Millers
#5 Gisholt Turret, bar & chuck, 1943
14" x 36" Landis Universal Grinder, 1942
12" x 36" Norton Universal Grinder, 1941
6" x 30" Norton Plain Grinders
5" Sellers Horiz. Mill, 12'6" to brg., 1943
16" American V-ram Shaper, M.D.
24", 12" Dill Trav. Hd. Slotters
30" x 30" x 8' N-B-P Planer, direct M.D.
24" x 24" x 4' Liberty Shaper—Planer, M.D.
7" Peerless Hydracut Saw, 1942
#6 Mitts & Merrill 3½" Keyseater
6000# "Pneumatic" Air Drop Hammer, 48" x 69"
#2B Nazel Hammer, M.D.
4" Oster "Rapiduction" Pipe Threader

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BRAKE, Press 36' x ⅝", 60" throat, Late
BULLDOZER, No. 4 Williams & White
FORGING ROLL, No. 5 Ajax, Air Clutch, M.D.
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HAMMERS, Steam Drop, 2,000# Chambersburg
MILLER, Ingersoll, 36x48x16', 3 Hds., M.D.
MILLER, Vert. No. 4 Kempsmith, table 18" x 76"
PRESS, Hyd., 250-Ton Chambersburg, 30" x 36"
PRESS, No. 59 Toledo, Str. 12", Bed 30" x 30"
PRESS, No. 59¾ Toledo Str. 14", Bed 36" x 37"
SHEAR, Plate Type "E" L&A, 60" x 1¼", 20" thr.
SHEAR, Plate, 132" x 1½" Morgan, 26" Throat
STRAIGHTENER, 48" American, 13-Rolls, 2¾"
STRAIGHTENER, 54" 17-Roll McKay, Backed Up
STRAIGHTENER, 17-Roll McKay, 60" x 4¼"
UPSETTER, 2" Acme

LANG MACHINERY COMPANY
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Boring Mills, 24"-36"-42"-52".
Grinder Universal No. 4—12" x 60" B. & S.
Hammer, Nazel 5-N, 6" x 8", M.D.
Keyseaters, Nos. 1 and 2 Baker, M.D.
Millers, Plain and Vert. Nos. 3-4-5.
Shaper, Draw Cut 36" Morton.
Shears, Squaring, 11' x 10 ga. and 10' x 3/16".
Slitter, Gang, 36" Lamb & Nash, M.D.
Straighteners, Gap, 75-90-125 ton.

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BORING MACHINES

2½" No. 25T Giddings & Lewis
3" No. 3A Universal
3¾" No. 32 Lucas
5" Jones planer table type
52" King vertical
100" Niles-Bement-Pond vertical
No. 2112 & 112B Excello precision
Nos. 42, 47A & 48A Heald Boremastic

DRILLS

20" No. 2 Mfg. Colburn
20" Cint. Bick. Super Service Mfg.
21" Canedy Otto
21" & 24" Cinti. Bickford
24" Kokomo
24" Cint. Bick. Super Service
No. 217 Baker 3 spindle
Nos. 121, 310, 315 & 513 Baker
No. 30HO Baker
3', 10" Morris radial
4' 11" Cint. Bick. Universal radial
4' Hammond radial, elbow arm
6', 15" Dreses radial
16" Allen 6 spindle, No. 2
24" Demco 4 spindle, No. 3
24" Foote Burt 6 spdl., No. 2
24" Allen 4 spdl., type 2K H

GEAR MACHINERY

Nos. 3 & 12 Barber Colman
Types A & T Barber Colman
Nos. 6 & 72 Fellows
Nos. 8H, 12H, 16HS & 18H Gould & Eberhardt
Nos. 1, 5A & 5AC Lees Bradner
No. 130 Cleveland Rigid hobber
No. 5M Adams Mfg. hobber and spline miller
3" Gleason spiral bevel gen.
No. 7 Gleason cutter grinder
18" Gleason testers & lappers
No. 8M Fellows Red Line Checker
24" Flather auto. spur
8"-12" Red Ring shaver
8" Red Ring lappers
Barnes Hut-O-Lap lappers
No. 4 Cimatool rounders

GRINDERS

6"x18", 10"x18", 10"x36", 10"-14"x72" & 16"x36" Norton
4"x18", 6"x18", 10"x18", 10"x24", 14"x36" & 16"x72" Landis
6"x18" & 6"x32" Brown & Sharpe
Nos. 1, 2 & 13 Brown & Sharpe univ.
10"x24" Landis universal
26" No. 226 Gardner disc
53" No. 372 Besly horiz. disc
30" No. 230 Hanchett opposed disc
16" No. 214 Hanchett opposed disc
15" No. 115 Gardner opposed disc

LATHES, ENGINE

14"x6' Lodge & Shipley
16"x6' Monarch
16"x10' American
18"x8' Hendey
18"x8' Rockford
18"x12' Bradford
19"x8' Leblond
20"x8' Lodge & Shipley
25"x48' centers Leblond
36"x16' Bridgeford

LATHES, TURRET

Nos. 2, 3, 4, 1A & 3A Warner Swasey
No. 7 Bardons & Oliver
Nos. 2 & 3 Morey
Nos. 3, 4, 5, 3AL & 28" Gisholt
6. 2 Denver
No. 4 Midland
No. 3 Jones & Lamson
No 5 Foster
3"x36" & 4"x34" Jones & Lamson
24" & 36" Bullard vertical
No. 2FU Foster Fastermatic

PLANERS & SHAPERS

30x24x6' Liberty O.S. planer
20" & 24" Gemco shapers
16", 20" & 24" G&E shapers
24" Columbia Universal shaper
6" P. & W. vertical shaper

FORGING TOOLS

2" National Upsetter
4" Ajax upsetter
No. 1 Ajax forging roll
No. 5N Nazel air hammer
600 ton Hamilton forging press
⅜" Wat. Farrel OD SS cold header

MILES MACHINERY CO.
SAGINAW, MICH.

Continued from Page 186

1—Special depreciation allowances on exported equipment; and 2—proper guarantees of income earned from the use of the equipment, even though the machinery would be leased.

Keating said the plan would work if the Government were to include in Point 4 a provision for more rapid amortization of remaining capital invested in machinery that American manufacturers might elect to ship abroad, plus minimum 10 pct rental guarantee payable in dollars. He said that under such an arrangement the primary aim of the Point 4 program, which is to increase private investment abroad to $2 billion annually by 1952, could be achieved.

Lunney, Fox at Chicago MDNA

Chicago—Frank Lunney, president of the Machinery Dealers National Assn., and Jack Fox, new MDNA executive director, attended the meeting of the Chicago chapter held on Nov. 17. Current business and the planning of a ladies'-night Christmas party were discussed.

Representatives attending the meeting reported that their business was slow but steady, and they all expect improved conditions starting next year.

Goldman Co. Host to MDNA

Detroit—The Detroit chapter of MDNA met Nov. 8 at Harvey Goldman Co. and adopted a policy of meeting at various warehouses, having a caterer-served dinner, and discussing current topics with the help of guest speakers. Subject discussed at Nov. 8 meeting was "Business Letters." The next meeting is scheduled for Dec. 13 at J. Lee Hackett Co. warehouse.

Mitshkin Joins Builders Supply

Dearborn — Maurice D. Mitshkin, familiarly known in the railway supply industry for over 40 yr as "Mitsh," was recently appointed general manager of the Builders Steel Supply Co., Dearborn.

Resume Your Reading on Page 187

—LATEST TYPE—Nearly New—

MACHINE TOOLS

BORING MILLS—Horizontal
CINCINNATI GILBERT 3½" bar, floor type, latest
LUCAS #41, 3" bar, Table Type, "Precision", Latest
LUCAS #43, 5" bar, Table Type, "Precision", M.D.
NILES-BEMENT-POND 5", 8" bar, Floor type, M.D.
UNIVERSAL 3" bar, high speed, latest type

BORING MILLS—Vertical
BULLARD 12, 16", 6 spindle Mult-Au-Matic, Type D, single or double spindle, Latest Type
BULLARD 24", 36", 42" "Spiral Drive," Latest Type
KING 62", 2 swivel heads, Rapid Traverse, M.D.
NILES 100", 2 swivel heads, PRT, D.C., Motor Dr.

DRILLS—Miscellaneous
AMERICAN 4' arm 11" col., "Hole Wizard", Latest
LELAND & GIFFORD #2 LMS 6 spindle, Latest
NATCO 4 AL 30 spindle, Multiple, Latest Type
PRATT & WHITNEY 1Bx50" Deep Hole, Latest

GEAR CUTTING EQUIPMENT
FELLOWS 61A, #61, #7, #7A, #72, #725, #77, #Z, #6Z2, High Speed Gear Shapers, latest type
GLEASON 3", 12" straight bevel generator, Latest
GLEASON 24", 77", 96", Bevel Gear Planer, Motor Dr.
GOULD & EBERHARDT 12H, 96H, Hobber, m.d.

GRINDERS—Cyl.—Plain & Univ.
BROWN & SHARPE #1, 2, 3, 4, Universal, Latest
BROWN & SHARPE #13 Univ. Cutter & Tool, Latest
LANDIS 4x12, Type H, Plain Hyd., Latest Type
NORTON 6"x18", 10"x36", 14"x36", Type C, Pl., Hydraulic, Latest
NORTON 10"x72" Type C, Pl., Mechanical, Latest

GRINDERS—Miscellaneous
BARBER COLMAN #3, 4 hob sharpener, latest type
CINCINNATI #2, #4 Centerless "Filmatic," latest
HEALD 75A, 72A3, 72A5, 74, Internal, latest type
LANDIS #12 Centerless, Hydraulic, Latest Type

GRINDERS—Surface
BLANCHARD #11, 16" Mag. chuck, Latest Type
HANCHETT Series 300, 12"x48" Vert. Sp. Hy., Latest
HANCHETT #36 Vert. 36" Mag. Chuck, Latest
HANCHETT Series 120 Plano Horiz., 30"x120", Latest
HEALD 25A—Rotary—16" and 30" chuck, hyd., latest
THOMPSON 12x12x24 Type B Hyd., Latest Type

LATHES—Engine & Mfg.
AMERICAN 36"x360" centers, 2 carriages, motor dr.
LODGE & SHIPLEY 14"x30", 16"x30" Centers, latest
MONARCH 10"x20" centers, Model EE Timken, latest
MONARCH 12"x30" Centers, 12x54" Centers, Model CK, Timken Bearing, Latest Type
MONARCH 22"x450" centers, 3 carriages, Timken Bearing, Model CM, motor drive
NILES 30x50" Boring, Timken, Latest Type
NILES 60"x55' centers, 2 carr., PRT, Latest
PRATT & WHITNEY 16"x30" Centers, Latest Type

LATHES—Turret
BARDONS & OLIVER #5, #7, Timken, Latest Type
FOSTER #4FU "Fastermatic", Timken, Latest
GISHOLT #1L, #2L, #3L, Universal, Timken, Latest
GISHOLT #2, #4, Univ., TIMKEN, Latest Type
JONES & LAMSON #3, #5 Univ., Timken, Latest
MOREY No. 2G, No. 3, No. 4, Timken Bearing, latest
WARNER & SWASEY #2A Univ., Timken, Latest
WARNER & SWASEY 4A Universal, Timken, Bar and Chucking (New 1947)

MILLING MACHINES—Plain
BROWN & SHARPE 2B, 3B, Timken, Latest Type
CINCINNATI 4-36, 2-18 Hydromatic, Simplex, latest
KEARNEY & TRECKER 121S, 140L, Latest type
KEARNEY & TRECKER 2H, 3H, 4H, 5H, Timken Bearing, Latest Type

MILLING MACHINES—Thread
LEES BRADNER 12"x54", Model HT, Latest Type
MOREY 12"x30" and 60" centers, Latest Type
PRATT & WHITNEY 6x60", Model C, Latest Type

MILLING MACHINES—Universal
BROWN & SHARPE 2A, 3A, Timken, Latest Type
KEARNEY & TRECKER 2H, Timken, Latest Type
VAN NORMAN #12, #26, #36, Timken, Latest Type

MILLING MACHINES—Vertical
BROWN & SHARPE #2B, Timken, Latest Type
CINCINNATI #2 Dial Type, Timken, latest type
GORTON #8D, #8½D, high speed, latest type
KEARNEY & TRECKER #2K, #3H, Timken, latest

PLANERS
BETTS (CONSOLIDATED) 84"x92"x16', 4 heads, Box Table, Power Rapid Traverse, D.C., M.D.
BETTS (CONSOLIDATED) 108"x84"x50', 4 heads, Box Table, Power Rapid Traverse, D.C., M.D.
NILES "Time Saver," 42"x42"x14', 3 heads, Rapid Traverse, A.C. vari-voltage drive, Latest
NILES 108"x84"x42', 4 heads, Power Rapid Traverse, Box Table, D.C. reversing motor drive

SCREW MACHINES—Automatic & Chucking
CONOMATIC 2¾"—6 spindle, Latest Type
GOSS & DeLEEUW 6"x8¾" Auto. Chucker, Latest
GOSS & DeLEEUW 8" Auto. Chucker, 5 spin., Latest

MISCELLANEOUS
BARNES #12, 306H, 307, 307B Vertical Hone. Hydraulic, Self-Oiling, Latest Type
CINCINNATI 1-30, 2-30, Duplex Vert. Surface Broach, Double ram, Model ER Hyd., Latest Type
CINCINNATI Series 300, ⅛"x8'6" Press Brake, MD
HENRY & WRIGHT 50 ton Dieing Press, M.D.
LAKE ERIE 500 ton Vertical Hydraulic Press, latest
MICHIGAN 170S, 1712 Universal Reliever, Latest
VERSON #206, 10 gauge x 96" cap. Press Brake, latest

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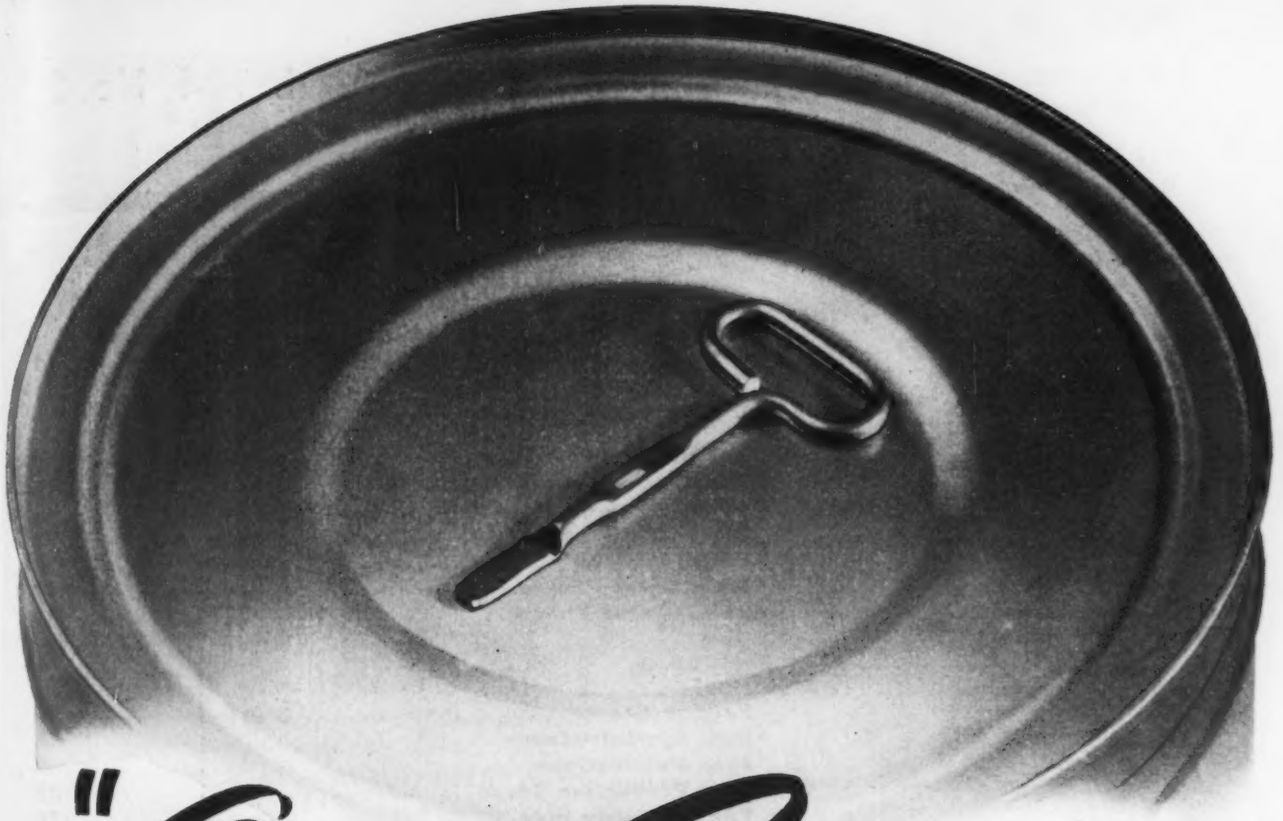

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